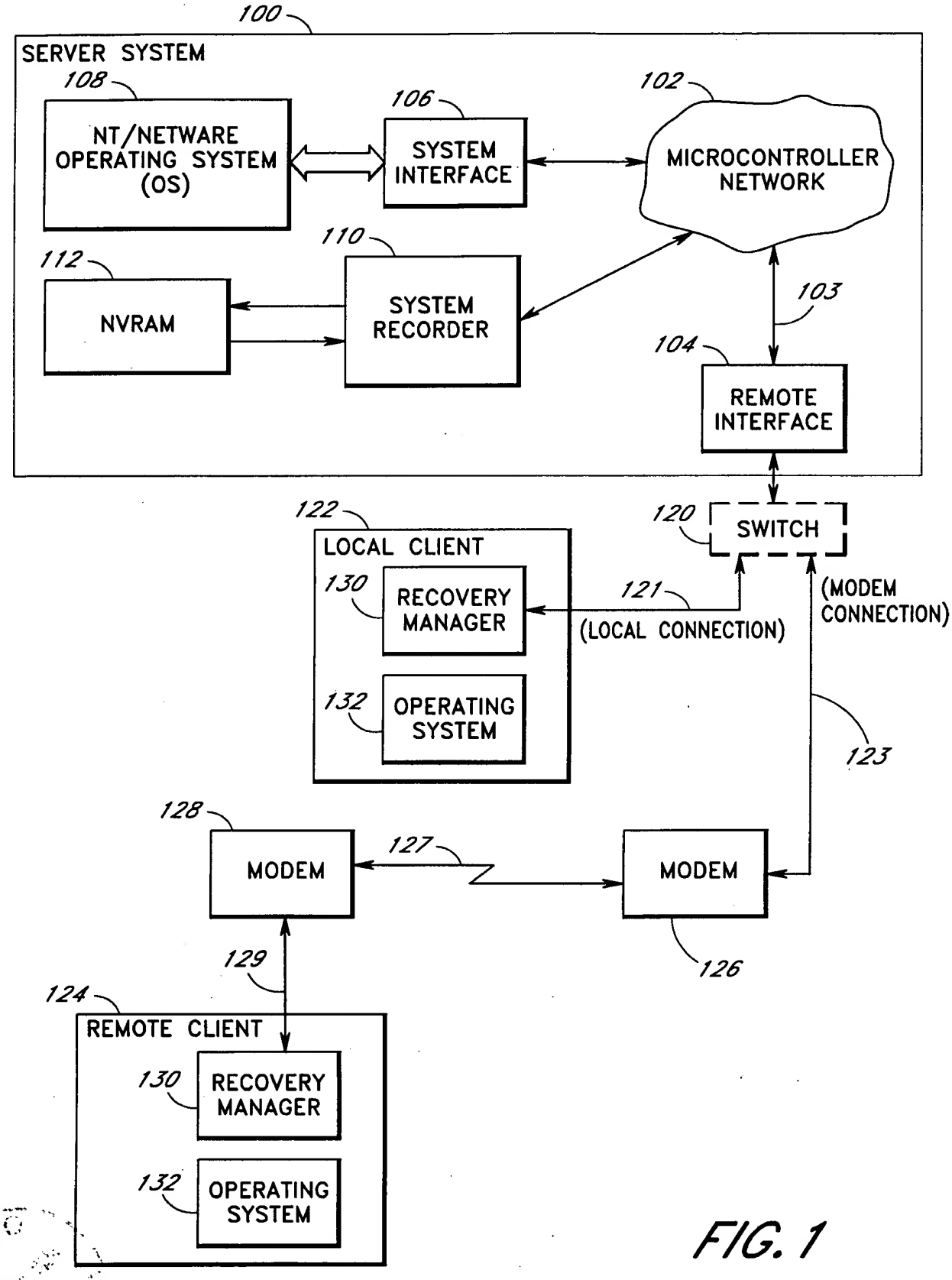

100
SERVER SYSTEM
108
NT/NETWARE OPERATING SYSTEM (OS)
106
SYSTEM INTERFACE
102
MICROCONTROLLER NETWORK
110
112
NVRAM
SYSTEM RECORDER
103
104
REMOTE INTERFACE
120
SWITCH
122
LOCAL CLIENT
130
RECOVERY MANAGER
121
(LOCAL CONNECTION)
(MODEM CONNECTION)
132
OPERATING SYSTEM
123
128
MODEM
127
MODEM
129
126
124
REMOTE CLIENT
130
RECOVERY MANAGER
132
OPERATING SYSTEM

FIG. 1

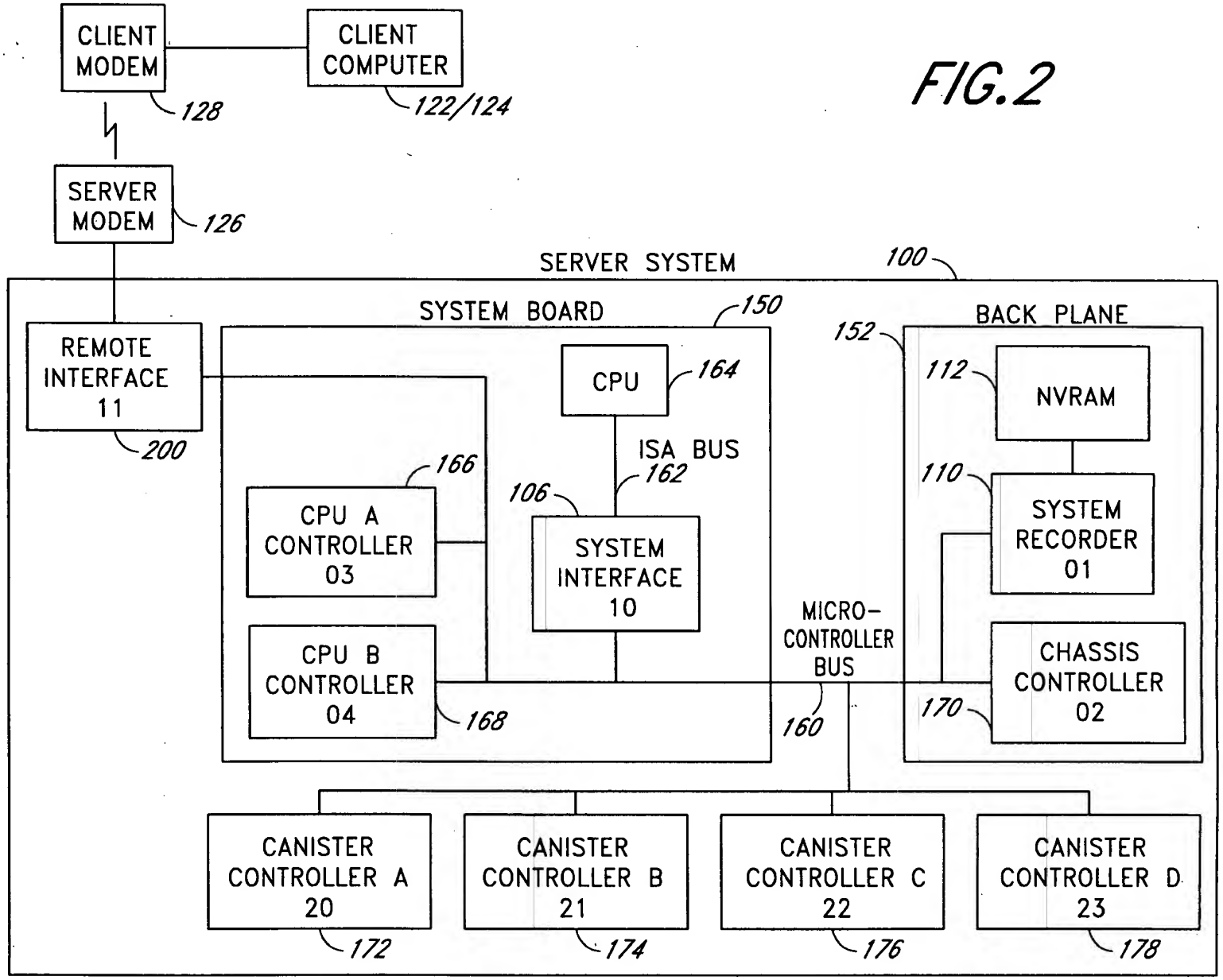

CLIENT MODEM
128
CLIENT COMPUTER
122/124
SERVER MODEM
126
SERVER SYSTEM
100
SYSTEM BOARD
150
BACK PLANE
152
REMOTE INTERFACE 11
200
CPU
164
ISA BUS
162
106
166
CPU A CONTROLLER 03
SYSTEM INTERFACE 10
CPU B CONTROLLER 04
168
MICRO-CONTROLLER BUS
160
112
NVRAM
110
SYSTEM RECORDER 01
CHASSIS CONTROLLER 02
170
CANISTER CONTROLLER A 20
172
CANISTER CONTROLLER B 21
174
CANISTER CONTROLLER C 22
176
CANISTER CONTROLLER D 23
178

FIG.2

# REMOTE INTERFACE SERIAL PROTOCOL MESSAGE FORMATS

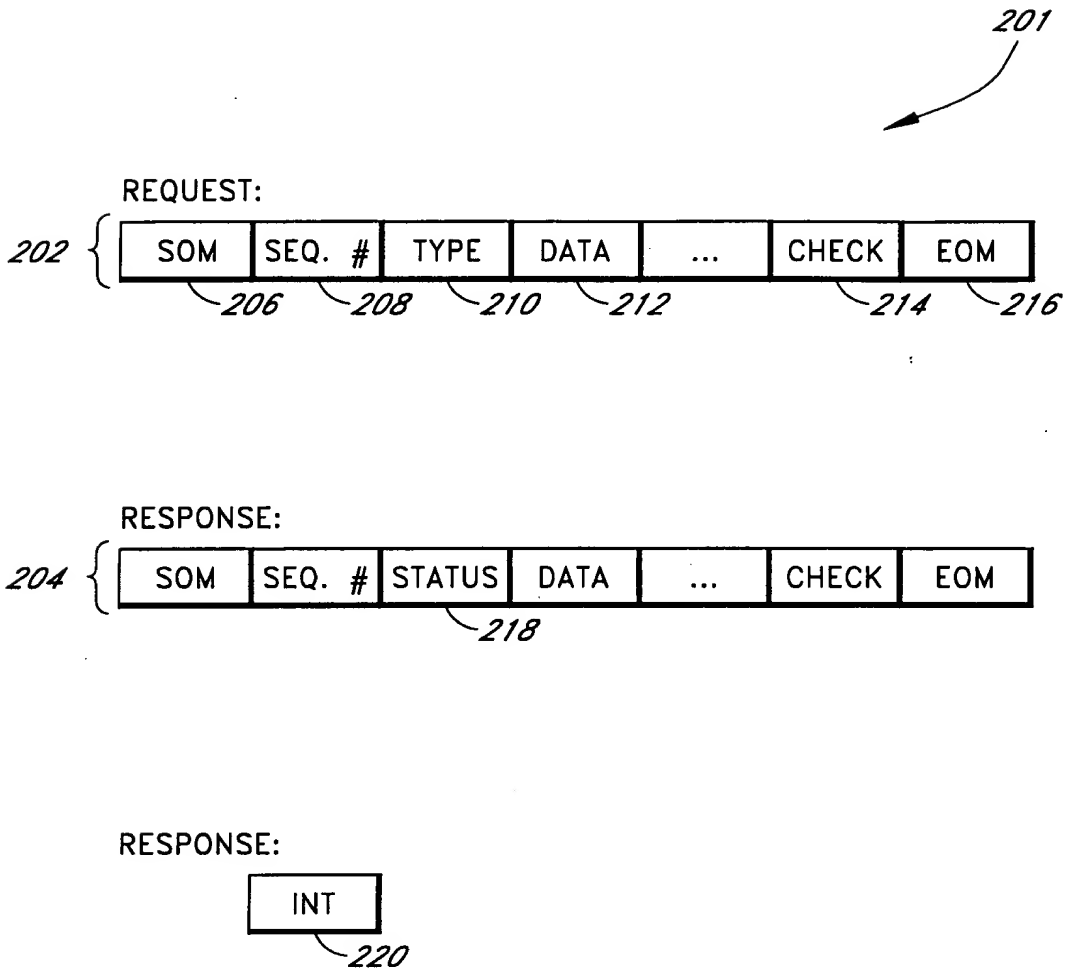



FIG. 3

POWER-ON PROCESS

FIG. 4A

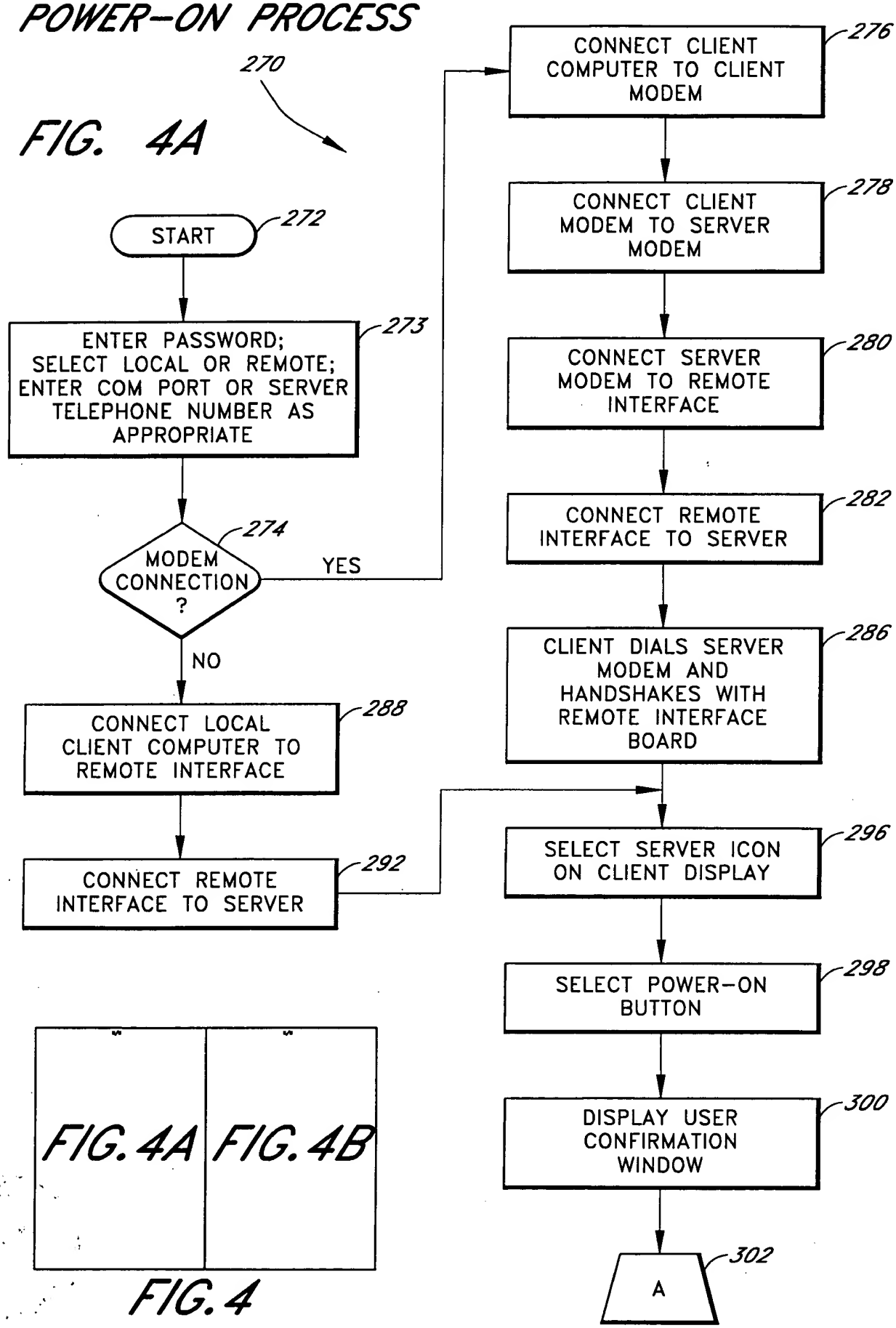



FIG. 4A FIG. 4B

FIG. 4

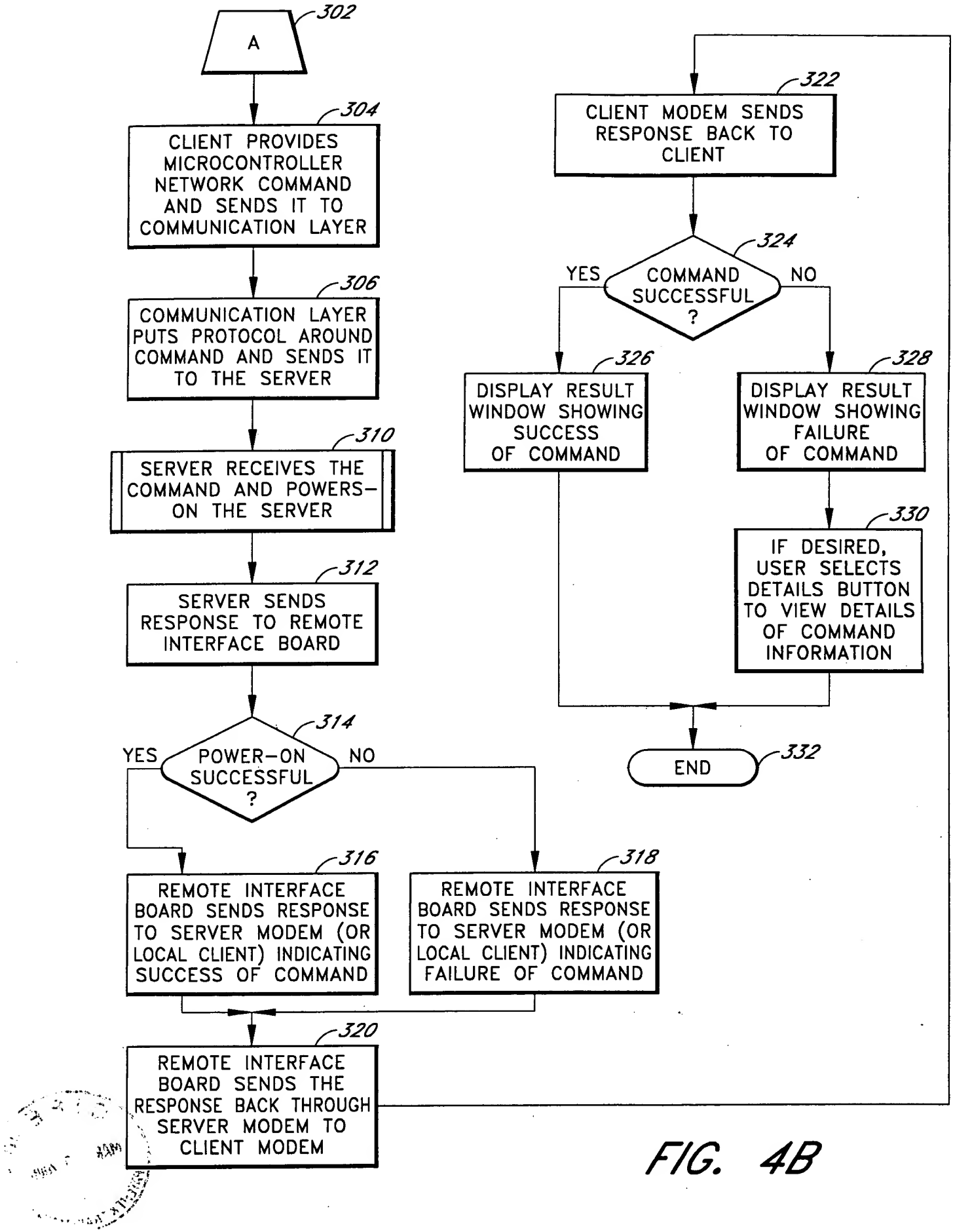

302
A
304
CLIENT PROVIDES MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
306
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
310
SERVER RECEIVES THE COMMAND AND POWERS-ON THE SERVER
312
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD
314
YES
POWER-ON SUCCESSFUL ?
NO
316
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING SUCCESS OF COMMAND
318
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING FAILURE OF COMMAND
320
REMOTE INTERFACE BOARD SENDS THE RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM
322
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
324
YES
COMMAND SUCCESSFUL ?
NO
326
DISPLAY RESULT WINDOW SHOWING SUCCESS OF COMMAND
328
DISPLAY RESULT WINDOW SHOWING FAILURE OF COMMAND
330
IF DESIRED, USER SELECTS DETAILS BUTTON TO VIEW DETAILS OF COMMAND INFORMATION
332
END

FIG. 4B

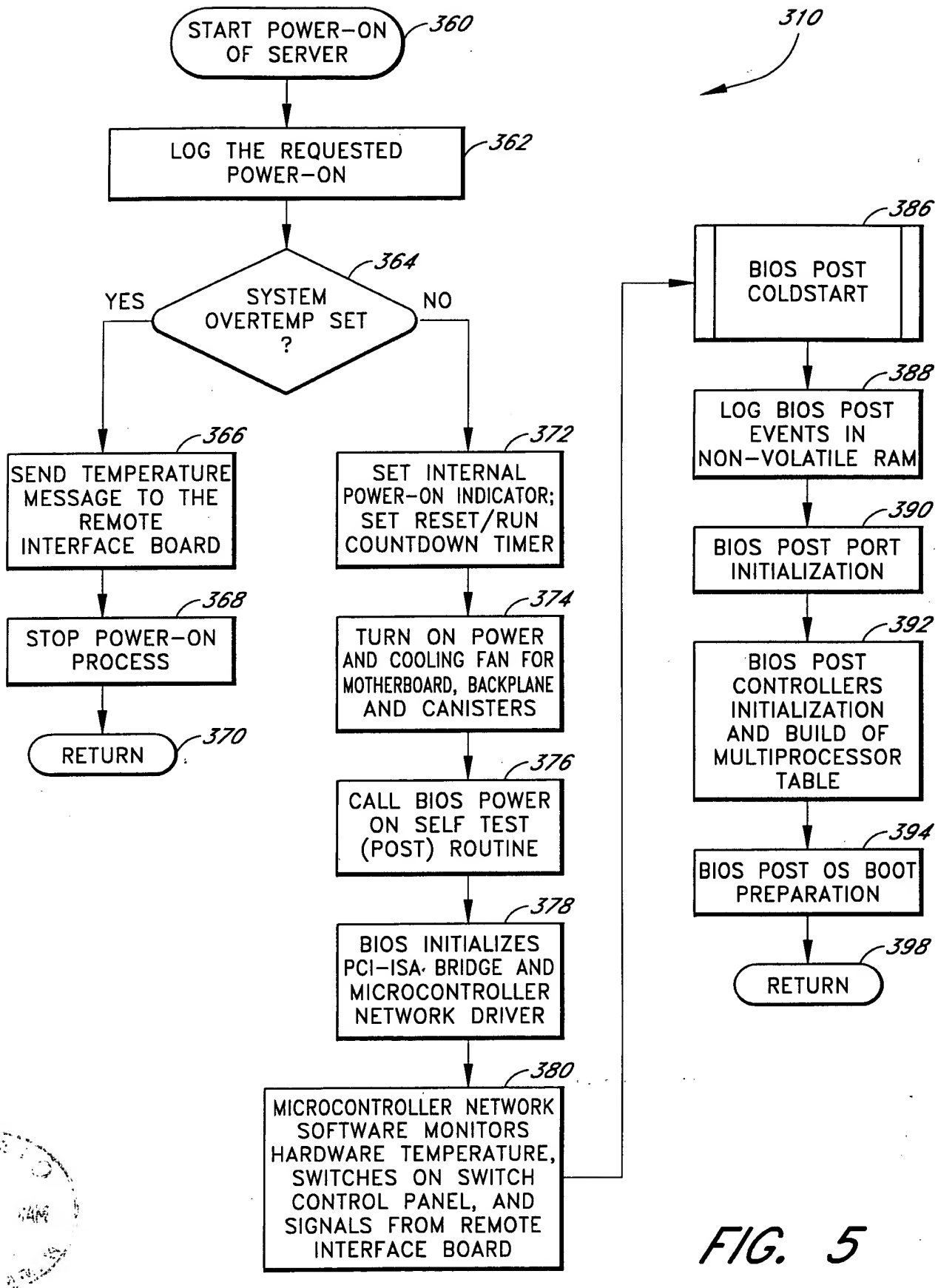

START POWER-ON OF SERVER
360
310
LOG THE REQUESTED POWER-ON
362
SYSTEM OVERTEMP SET ?
364
YES
NO
SEND TEMPERATURE MESSAGE TO THE REMOTE INTERFACE BOARD
366
STOP POWER-ON PROCESS
368
RETURN
370
SET INTERNAL POWER-ON INDICATOR; SET RESET/RUN COUNTDOWN TIMER
372
TURN ON POWER AND COOLING FAN FOR MOTHERBOARD, BACKPLANE AND CANISTERS
374
CALL BIOS POWER ON SELF TEST (POST) ROUTINE
376
BIOS INITIALIZES PCI-ISA BRIDGE AND MICROCONTROLLER NETWORK DRIVER
378
MICROCONTROLLER NETWORK SOFTWARE MONITORS HARDWARE TEMPERATURE, SWITCHES ON SWITCH CONTROL PANEL, AND SIGNALS FROM REMOTE INTERFACE BOARD
380
BIOS POST COLDSTART
386
LOG BIOS POST EVENTS IN NON-VOLATILE RAM
388
BIOS POST PORT INITIALIZATION
390
BIOS POST CONTROLLERS INITIALIZATION AND BUILD OF MULTIPROCESSOR TABLE
392
BIOS POST OS BOOT PREPARATION
394
RETURN
398

FIG. 5

POWER-OFF PROCESS

420

FIG. 6A

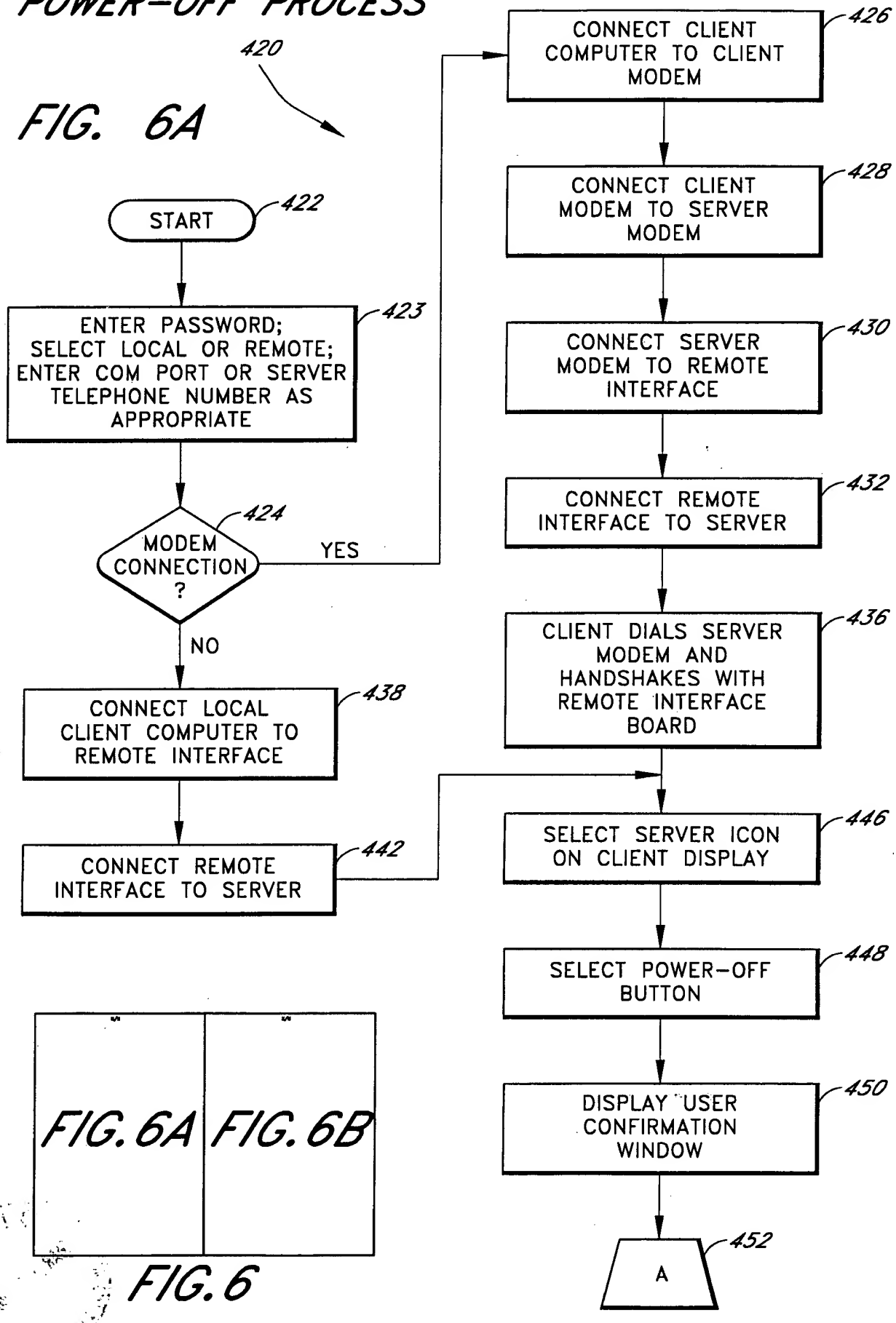



FIG. 6A | FIG. 6B

FIG. 6

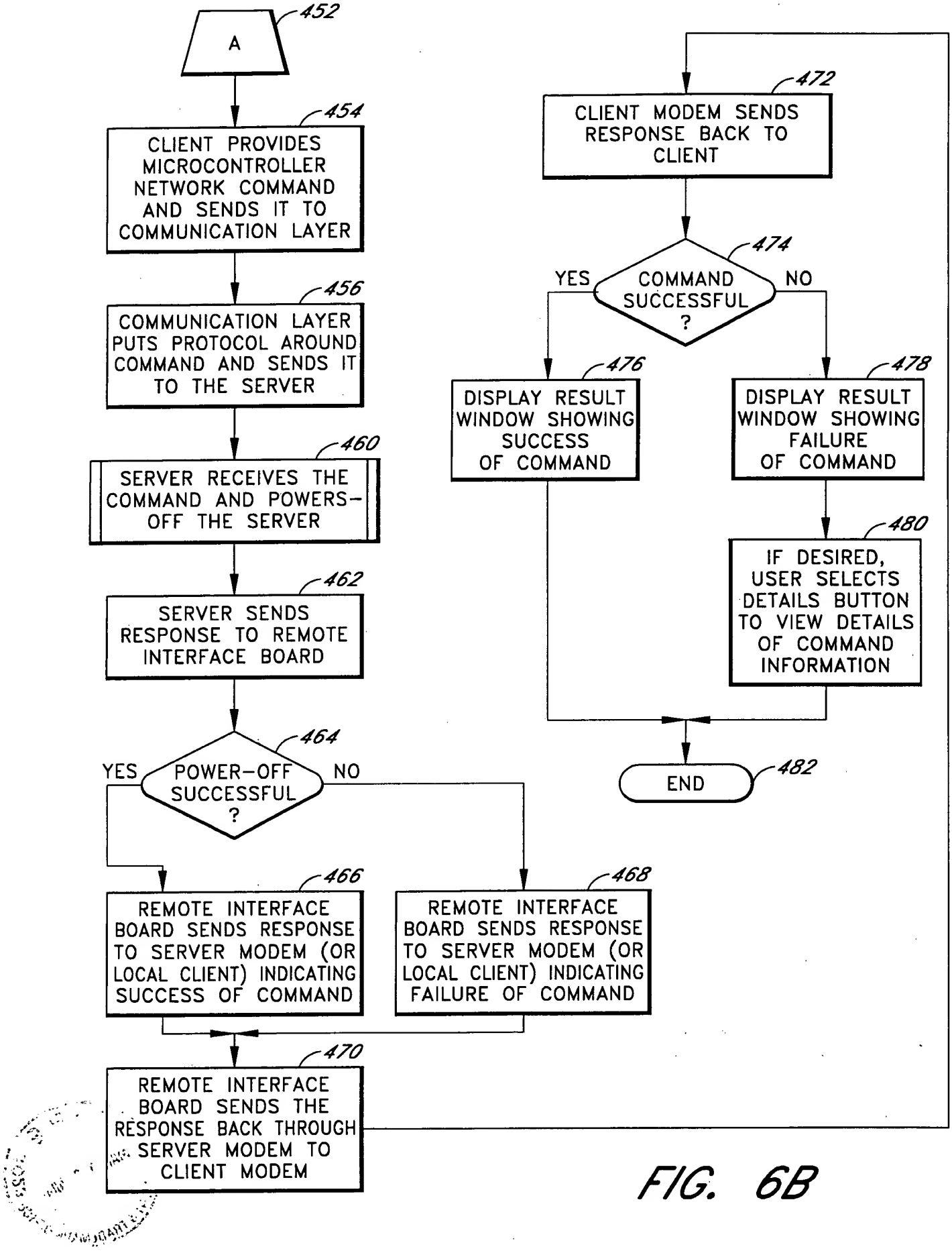

452
A
454
CLIENT PROVIDES MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
456
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
460
SERVER RECEIVES THE COMMAND AND POWERS-OFF THE SERVER
462
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD
464
YES
POWER-OFF SUCCESSFUL ?
NO
466
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING SUCCESS OF COMMAND
468
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING FAILURE OF COMMAND
470
REMOTE INTERFACE BOARD SENDS THE RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM
472
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
474
YES
COMMAND SUCCESSFUL ?
NO
476
DISPLAY RESULT WINDOW SHOWING SUCCESS OF COMMAND
478
DISPLAY RESULT WINDOW SHOWING FAILURE OF COMMAND
480
IF DESIRED, USER SELECTS DETAILS BUTTON TO VIEW DETAILS OF COMMAND INFORMATION
482
END

FIG. 6B

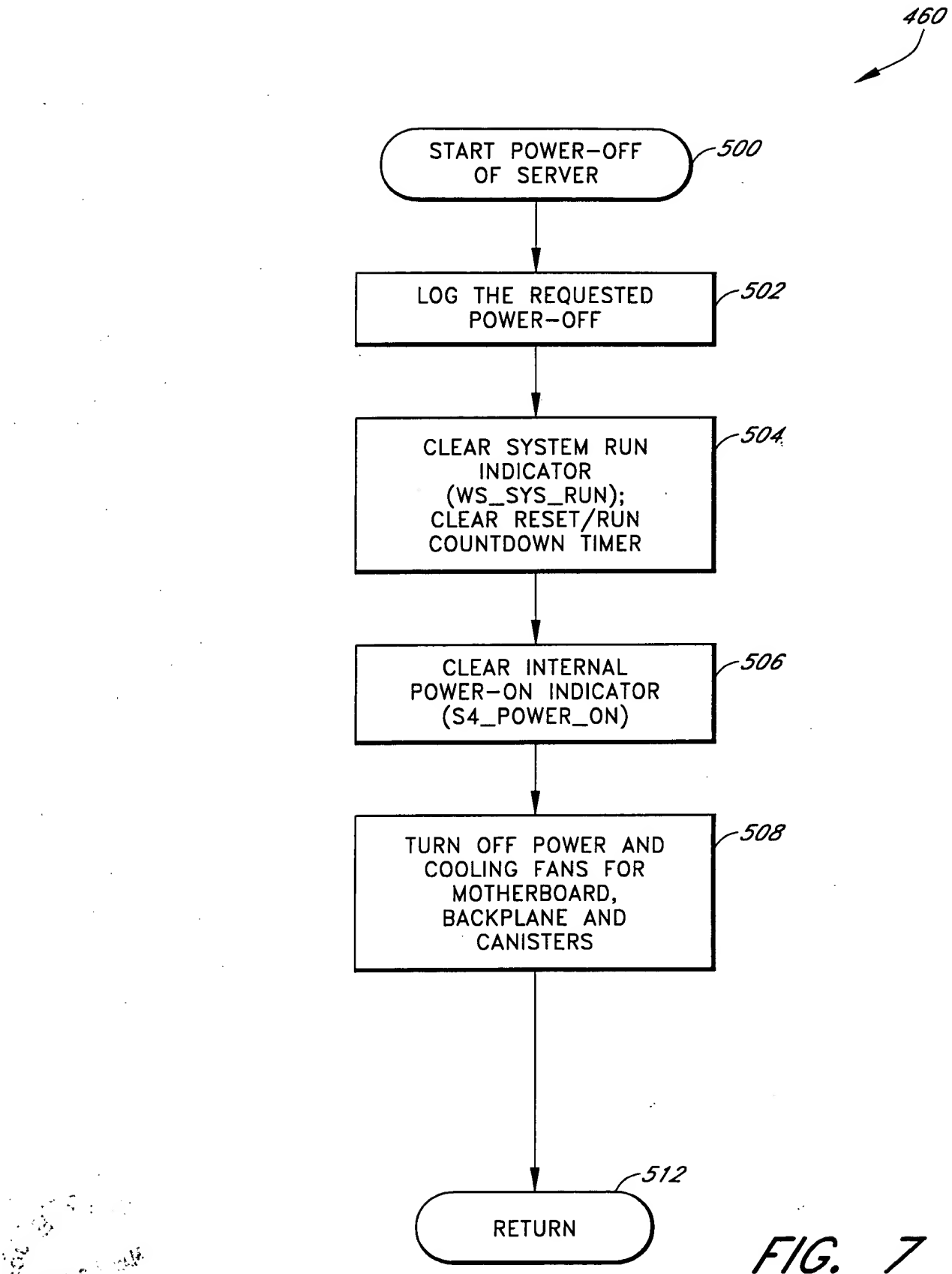

460
START POWER-OFF OF SERVER
500
LOG THE REQUESTED POWER-OFF
502
CLEAR SYSTEM RUN INDICATOR (WS_SYS_RUN); CLEAR RESET/RUN COUNTDOWN TIMER
504
CLEAR INTERNAL POWER-ON INDICATOR (S4_POWER_ON)
506
TURN OFF POWER AND COOLING FANS FOR MOTHERBOARD, BACKPLANE AND CANISTERS
508
RETURN
512

FIG. 7

RESET PROCESS

FIG. 8A

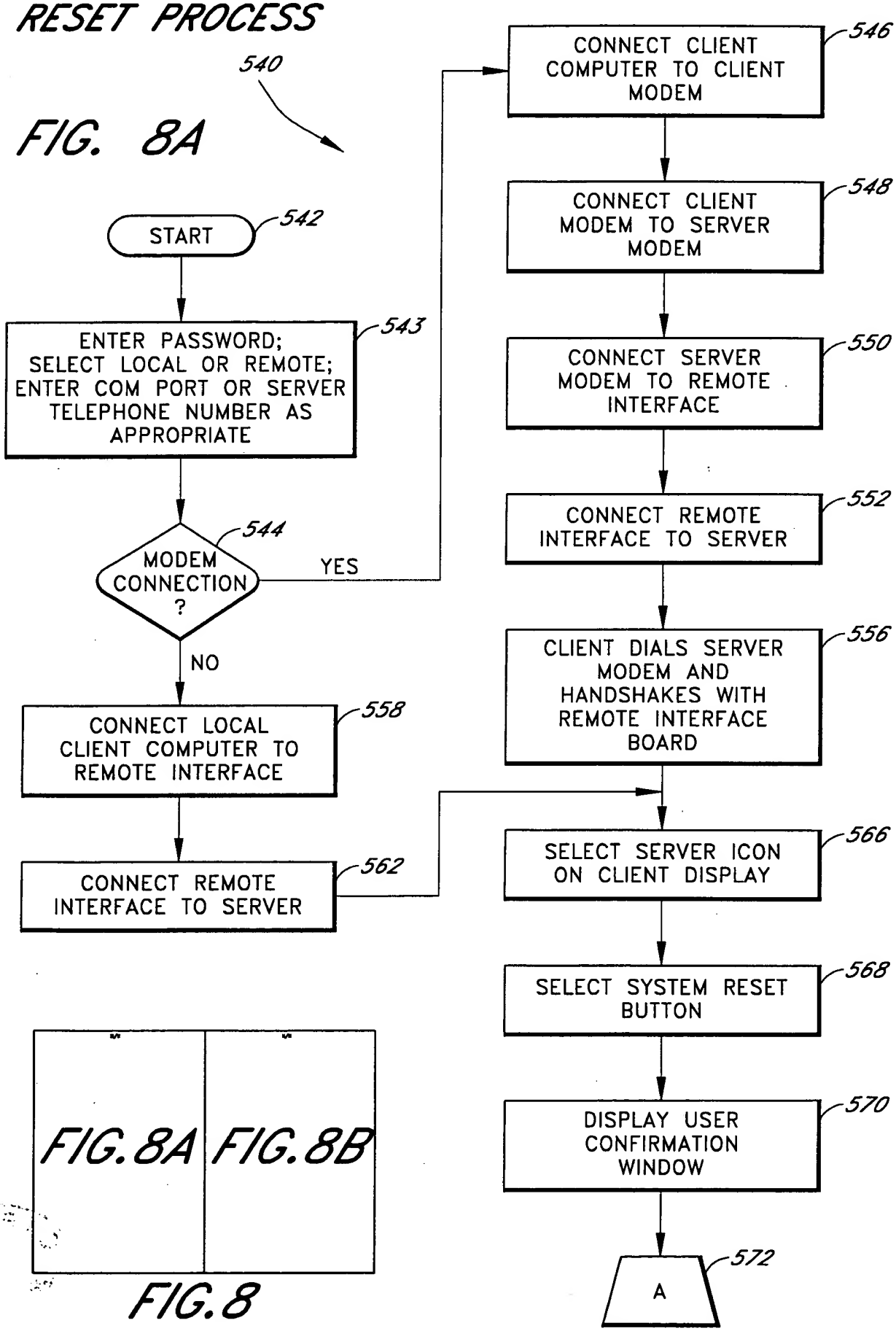



FIG. 8A | FIG. 8B

FIG. 8

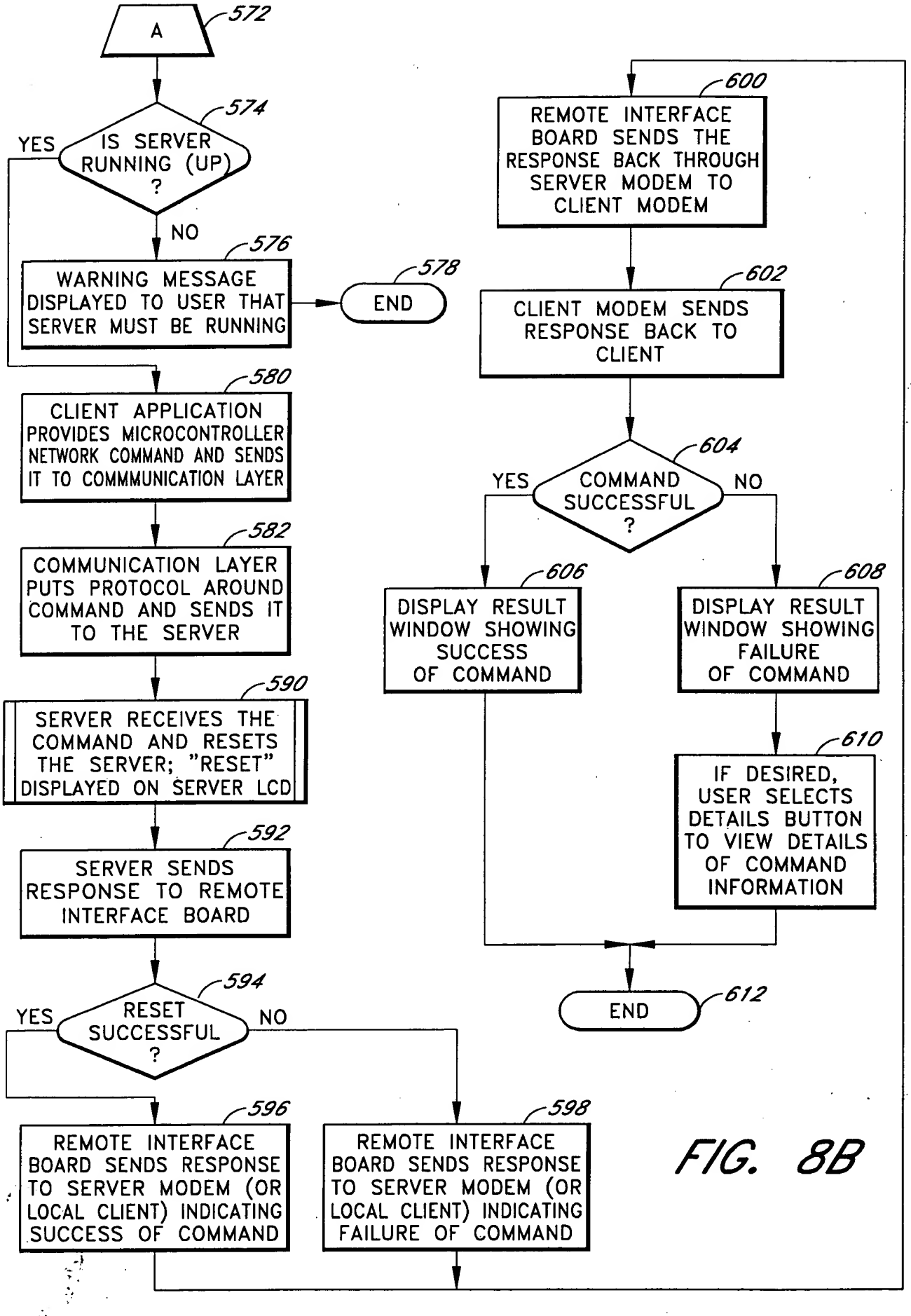

A
572
IS SERVER RUNNING (UP) ?
574
YES
NO
WARNING MESSAGE DISPLAYED TO USER THAT SERVER MUST BE RUNNING
576
END
578
CLIENT APPLICATION PROVIDES MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMMUNICATION LAYER
580
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
582
SERVER RECEIVES THE COMMAND AND RESETS THE SERVER; "RESET" DISPLAYED ON SERVER LCD
590
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD
592
RESET SUCCESSFUL ?
594
YES
NO
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING SUCCESS OF COMMAND
596
REMOTE INTERFACE BOARD SENDS RESPONSE TO SERVER MODEM (OR LOCAL CLIENT) INDICATING FAILURE OF COMMAND
598
REMOTE INTERFACE BOARD SENDS THE RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM
600
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
602
COMMAND SUCCESSFUL ?
604
YES
NO
DISPLAY RESULT WINDOW SHOWING SUCCESS OF COMMAND
606
DISPLAY RESULT WINDOW SHOWING FAILURE OF COMMAND
608
IF DESIRED, USER SELECTS DETAILS BUTTON TO VIEW DETAILS OF COMMAND INFORMATION
610
END
612

FIG. 8B

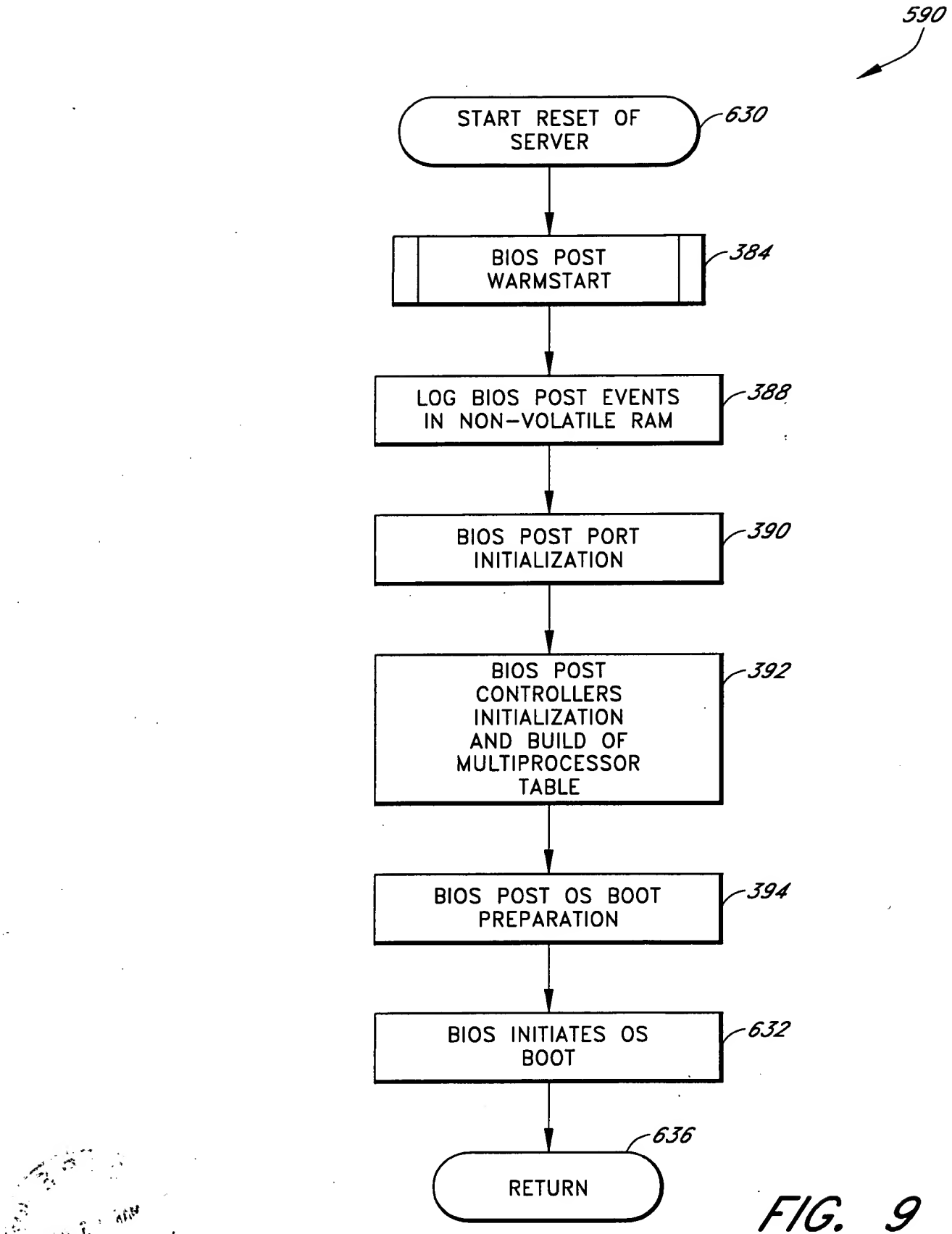

590
START RESET OF SERVER
630
BIOS POST WARMSTART
384
LOG BIOS POST EVENTS IN NON-VOLATILE RAM
388
BIOS POST PORT INITIALIZATION
390
BIOS POST CONTROLLERS INITIALIZATION AND BUILD OF MULTIPROCESSOR TABLE
392
BIOS POST OS BOOT PREPARATION
394
BIOS INITIATES OS BOOT
632
636
RETURN

FIG. 9

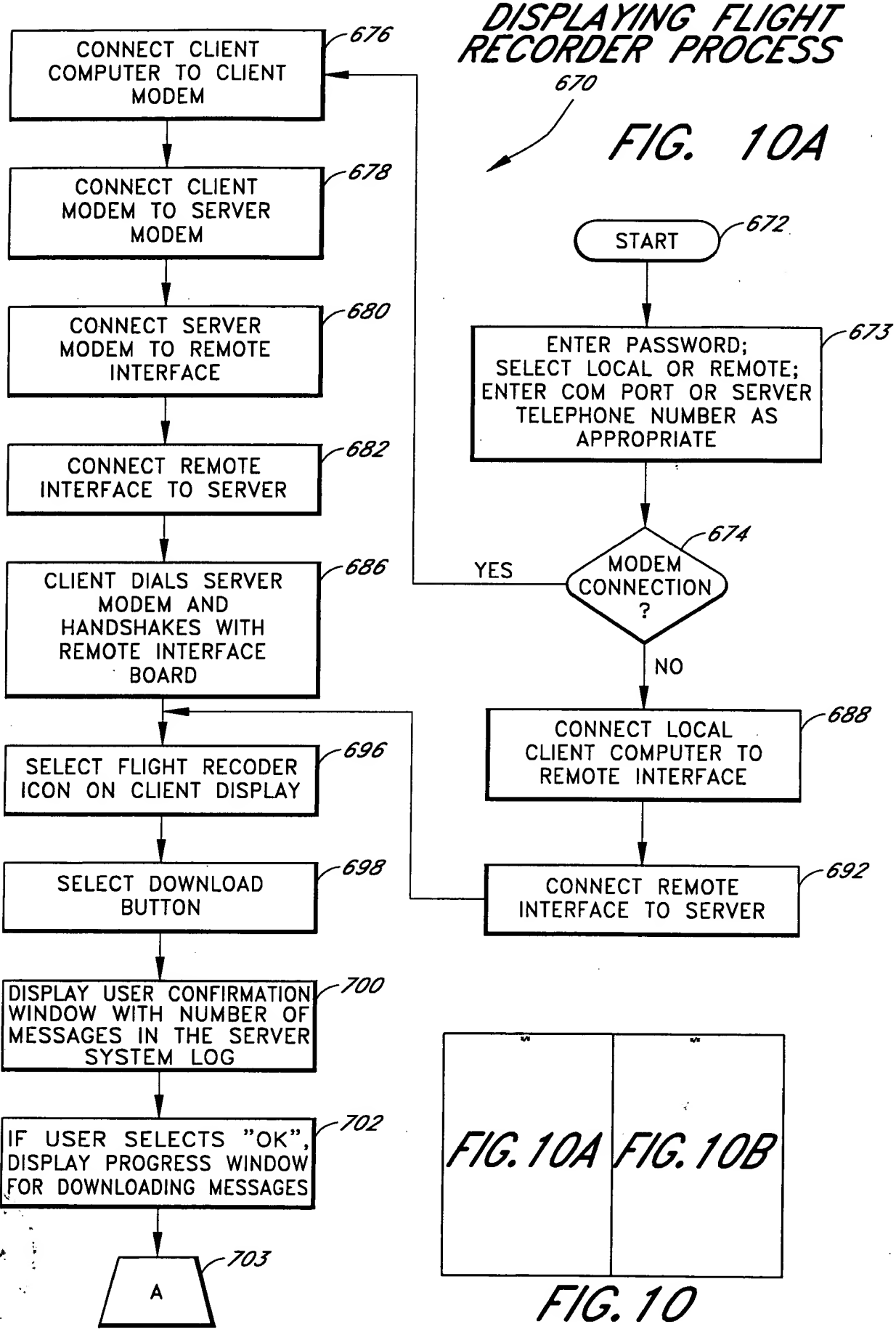



FIG. 10A

FIG. 10A | FIG. 10B

FIG. 10

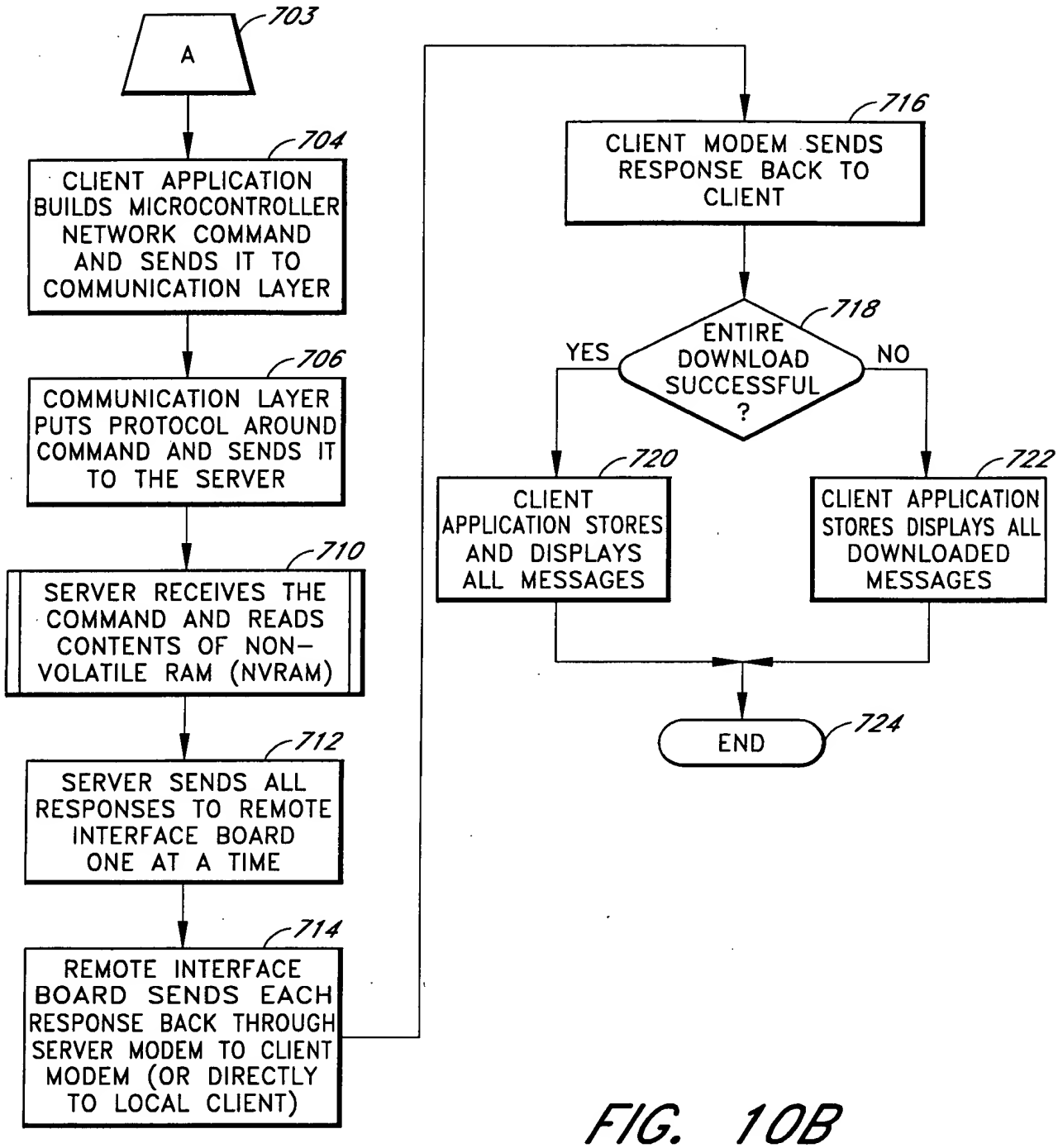

703
A
704
CLIENT APPLICATION BUILDS MICROCONTROLLER NETWORK COMMAND AND SENDS IT TO COMMUNICATION LAYER
706
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMAND AND SENDS IT TO THE SERVER
710
SERVER RECEIVES THE COMMAND AND READS CONTENTS OF NON-VOLATILE RAM (NVRAM)
712
SERVER SENDS ALL RESPONSES TO REMOTE INTERFACE BOARD ONE AT A TIME
714
REMOTE INTERFACE BOARD SENDS EACH RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM (OR DIRECTLY TO LOCAL CLIENT)
716
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
718
ENTIRE DOWNLOAD SUCCESSFUL ?
YES
NO
720
CLIENT APPLICATION STORES AND DISPLAYS ALL MESSAGES
722
CLIENT APPLICATION STORES DISPLAYS ALL DOWNLOADED MESSAGES
724
END

FIG. 10B

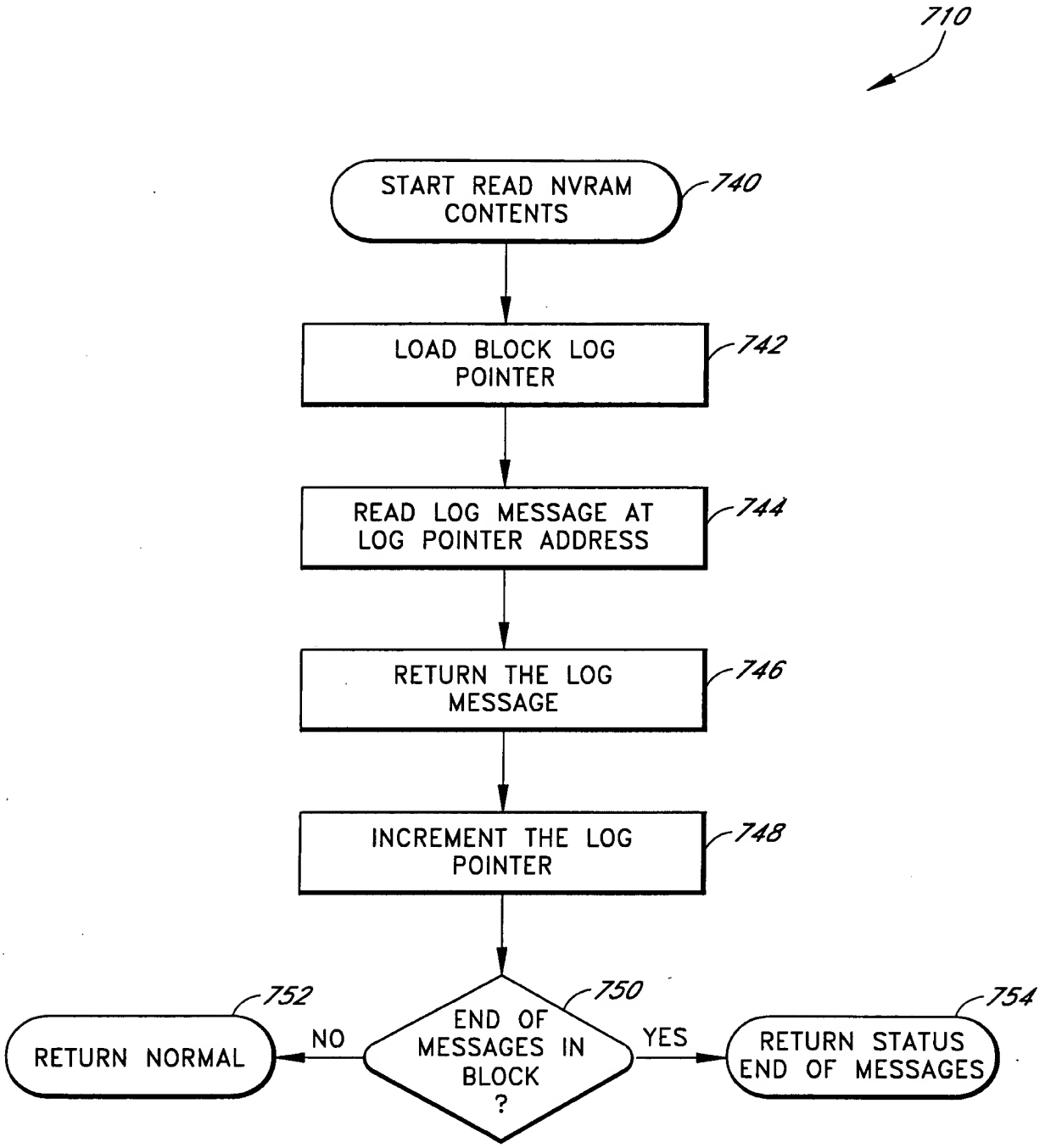

710
START READ NVRAM CONTENTS
740
LOAD BLOCK LOG POINTER
742
READ LOG MESSAGE AT LOG POINTER ADDRESS
744
RETURN THE LOG MESSAGE
746
INCREMENT THE LOG POINTER
748
END OF MESSAGES IN BLOCK ?
750
NO
YES
RETURN NORMAL
752
RETURN STATUS END OF MESSAGES
754

FIG. 11

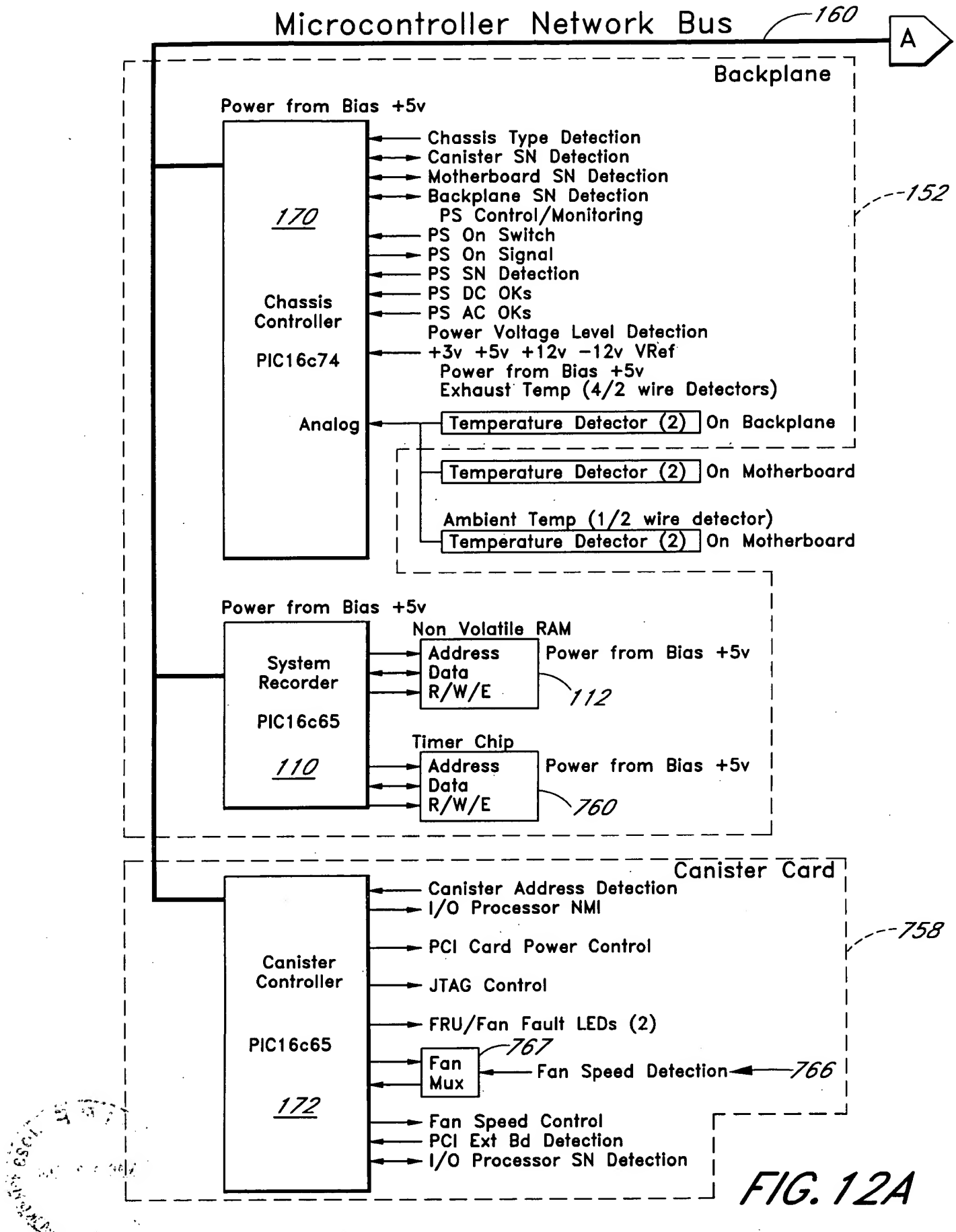

Microcontroller Network Bus
160
A
Backplane
Power from Bias +5v
Chassis Type Detection
Canister SN Detection
Motherboard SN Detection
Backplane SN Detection
PS Control/Monitoring
PS On Switch
PS On Signal
PS SN Detection
PS DC OKs
PS AC OKs
Power Voltage Level Detection
+3v +5v +12v −12v VRef
Power from Bias +5v
Exhaust Temp (4/2 wire Detectors)
170
Chassis Controller
PIC16c74
Analog
Temperature Detector (2) On Backplane
Temperature Detector (2) On Motherboard
Ambient Temp (1/2 wire detector)
Temperature Detector (2) On Motherboard
152
Power from Bias +5v
System Recorder
PIC16c65
110
Non Volatile RAM
Address
Data
R/W/E
Power from Bias +5v
112
Timer Chip
Address
Data
R/W/E
Power from Bias +5v
760
Canister Card
Canister Address Detection
I/O Processor NMI
PCI Card Power Control
JTAG Control
FRU/Fan Fault LEDs (2)
Canister Controller
PIC16c65
172
767
Fan Mux
Fan Speed Detection
766
Fan Speed Control
PCI Ext Bd Detection
I/O Processor SN Detection
758

FIG. 12A

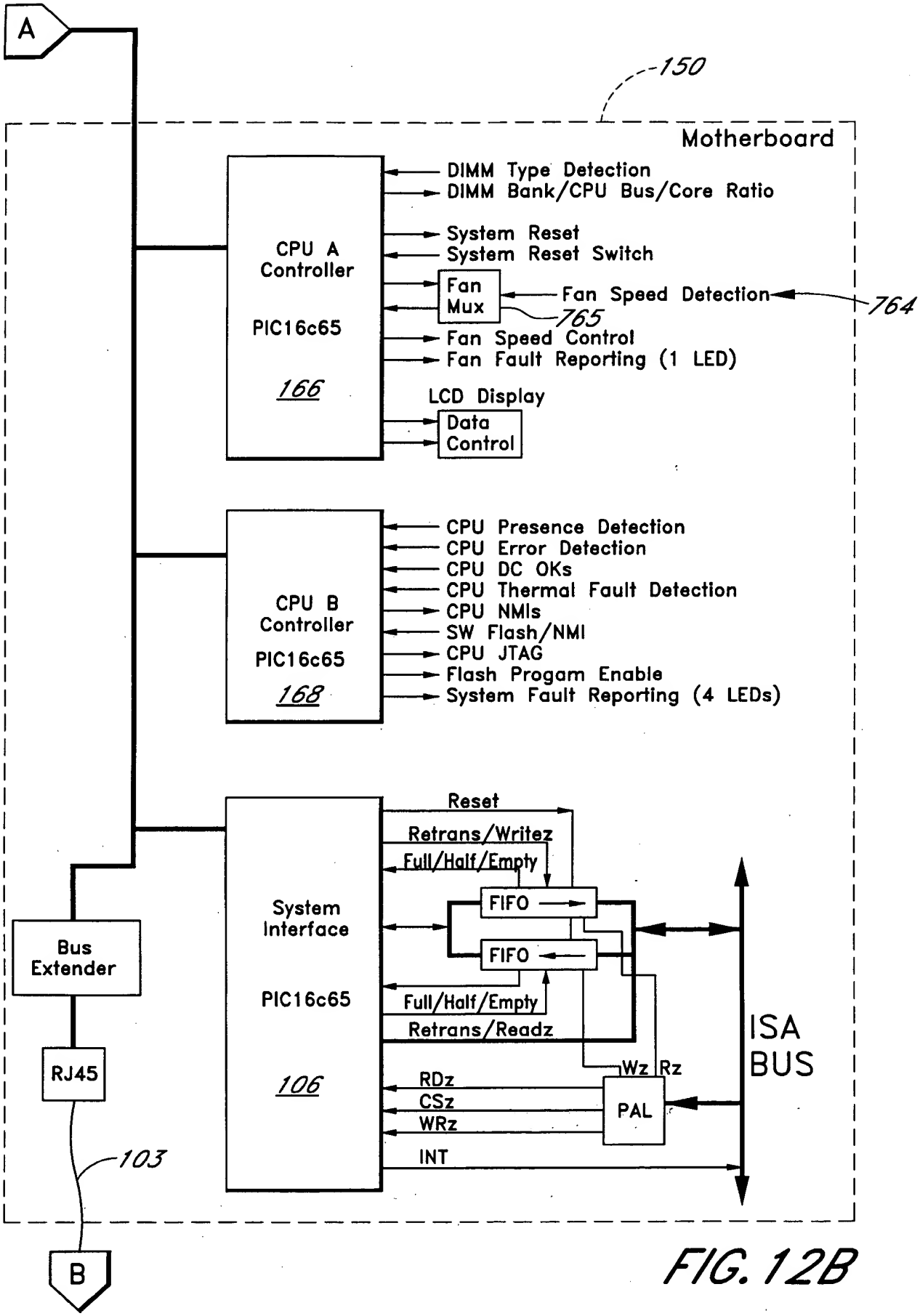

A
150
Motherboard
CPU A Controller
PIC16c65
166
DIMM Type Detection
DIMM Bank/CPU Bus/Core Ratio
System Reset
System Reset Switch
Fan Mux
Fan Speed Detection
764
765
Fan Speed Control
Fan Fault Reporting (1 LED)
LCD Display
Data Control
CPU B Controller
PIC16c65
168
CPU Presence Detection
CPU Error Detection
CPU DC OKs
CPU Thermal Fault Detection
CPU NMIs
SW Flash/NMI
CPU JTAG
Flash Progam Enable
System Fault Reporting (4 LEDs)
Bus Extender
RJ45
103
B
System Interface
PIC16c65
106
Reset
Retrans/Writez
Full/Half/Empty
FIFO
FIFO
Full/Half/Empty
Retrans/Readz
Wz
Rz
RDz
CSz
WRz
PAL
INT
ISA BUS

FIG. 12B

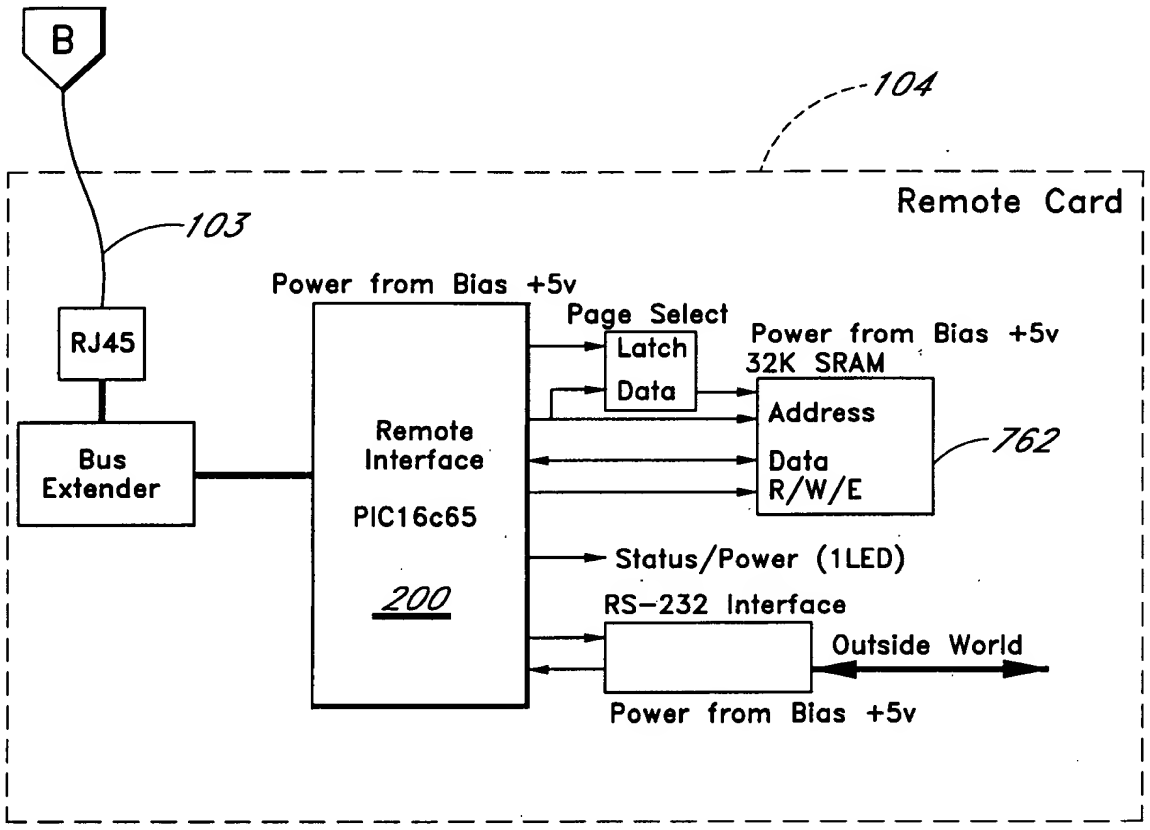
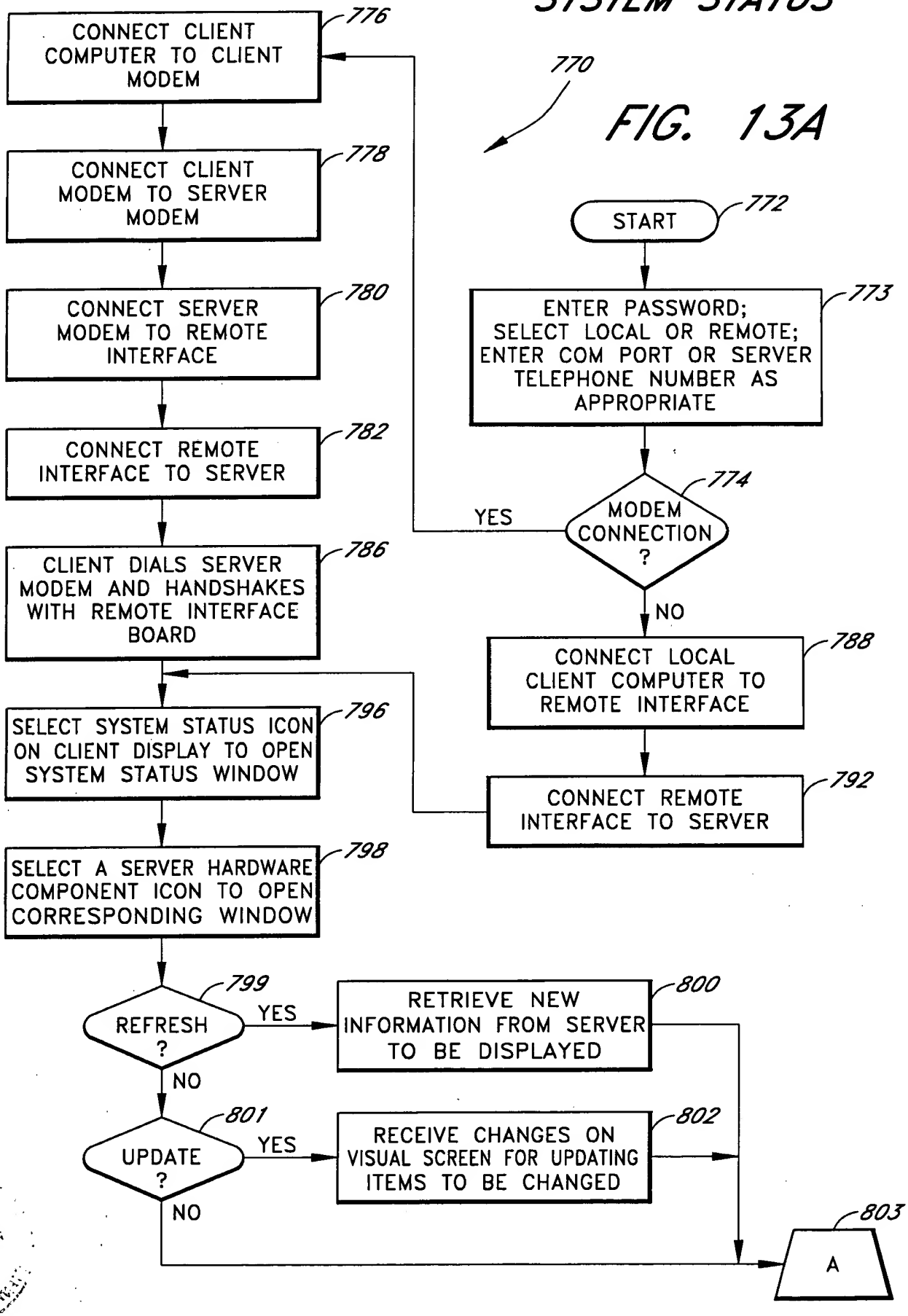

B
104
Remote Card
103
Power from Bias +5v
Page Select
Power from Bias +5v
32K SRAM
RJ45
Latch
Data
Address
Bus
Extender
Remote
Interface
PIC16c65
200
762
Data
R/W/E
Status/Power (1LED)
RS-232 Interface
Outside World
Power from Bias +5v

FIG. 12C

SYSTEM STATUS

FIG. 13A



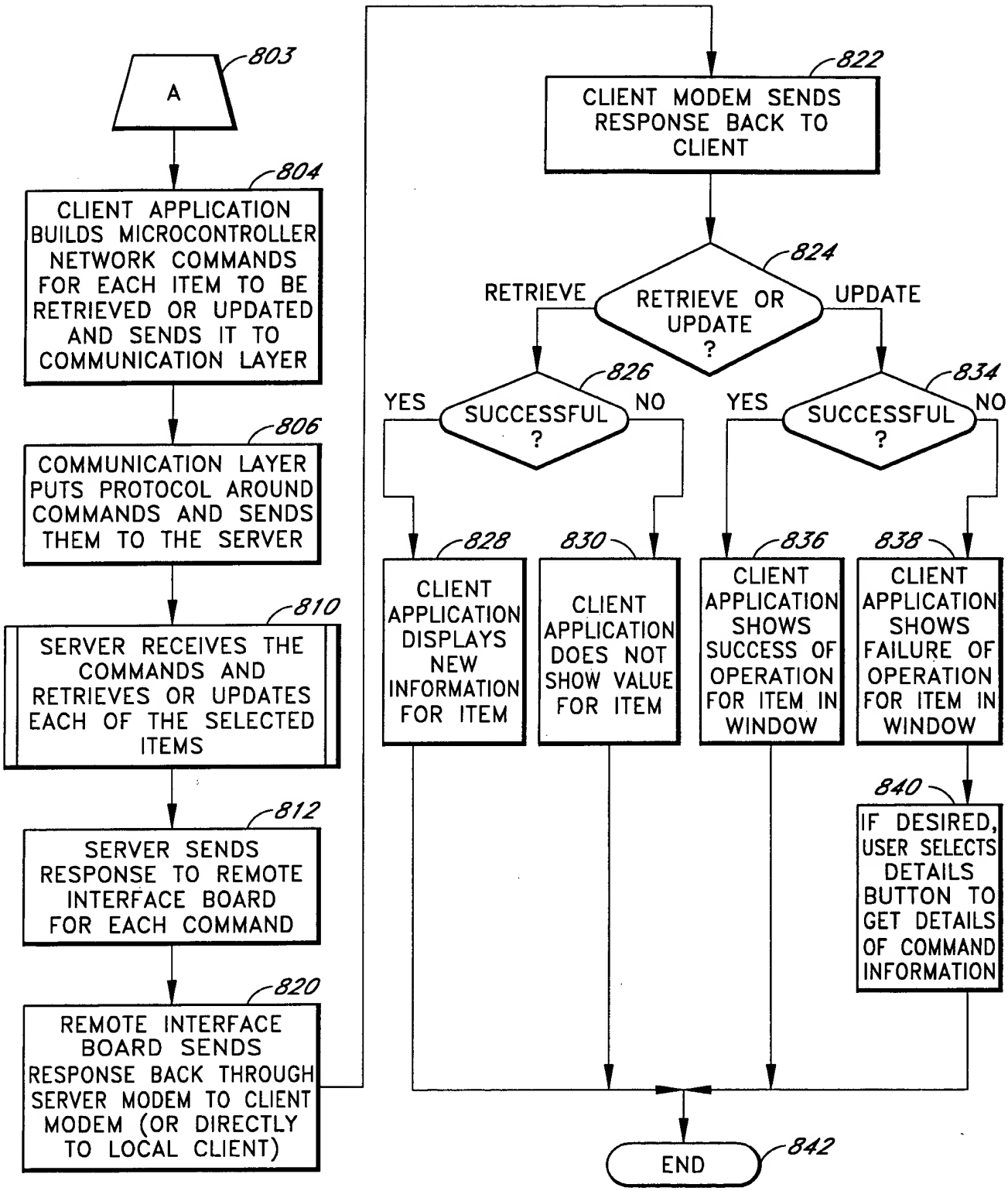

803
A
804
CLIENT APPLICATION BUILDS MICROCONTROLLER NETWORK COMMANDS FOR EACH ITEM TO BE RETRIEVED OR UPDATED AND SENDS IT TO COMMUNICATION LAYER
806
COMMUNICATION LAYER PUTS PROTOCOL AROUND COMMANDS AND SENDS THEM TO THE SERVER
810
SERVER RECEIVES THE COMMANDS AND RETRIEVES OR UPDATES EACH OF THE SELECTED ITEMS
812
SERVER SENDS RESPONSE TO REMOTE INTERFACE BOARD FOR EACH COMMAND
820
REMOTE INTERFACE BOARD SENDS RESPONSE BACK THROUGH SERVER MODEM TO CLIENT MODEM (OR DIRECTLY TO LOCAL CLIENT)
822
CLIENT MODEM SENDS RESPONSE BACK TO CLIENT
824
RETRIEVE OR UPDATE ?
RETRIEVE
UPDATE
826
SUCCESSFUL ?
YES
NO
834
SUCCESSFUL ?
YES
NO
828
CLIENT APPLICATION DISPLAYS NEW INFORMATION FOR ITEM
830
CLIENT APPLICATION DOES NOT SHOW VALUE FOR ITEM
836
CLIENT APPLICATION SHOWS SUCCESS OF OPERATION FOR ITEM IN WINDOW
838
CLIENT APPLICATION SHOWS FAILURE OF OPERATION FOR ITEM IN WINDOW
840
IF DESIRED, USER SELECTS DETAILS BUTTON TO GET DETAILS OF COMMAND INFORMATION
END
842

FIG. 13B

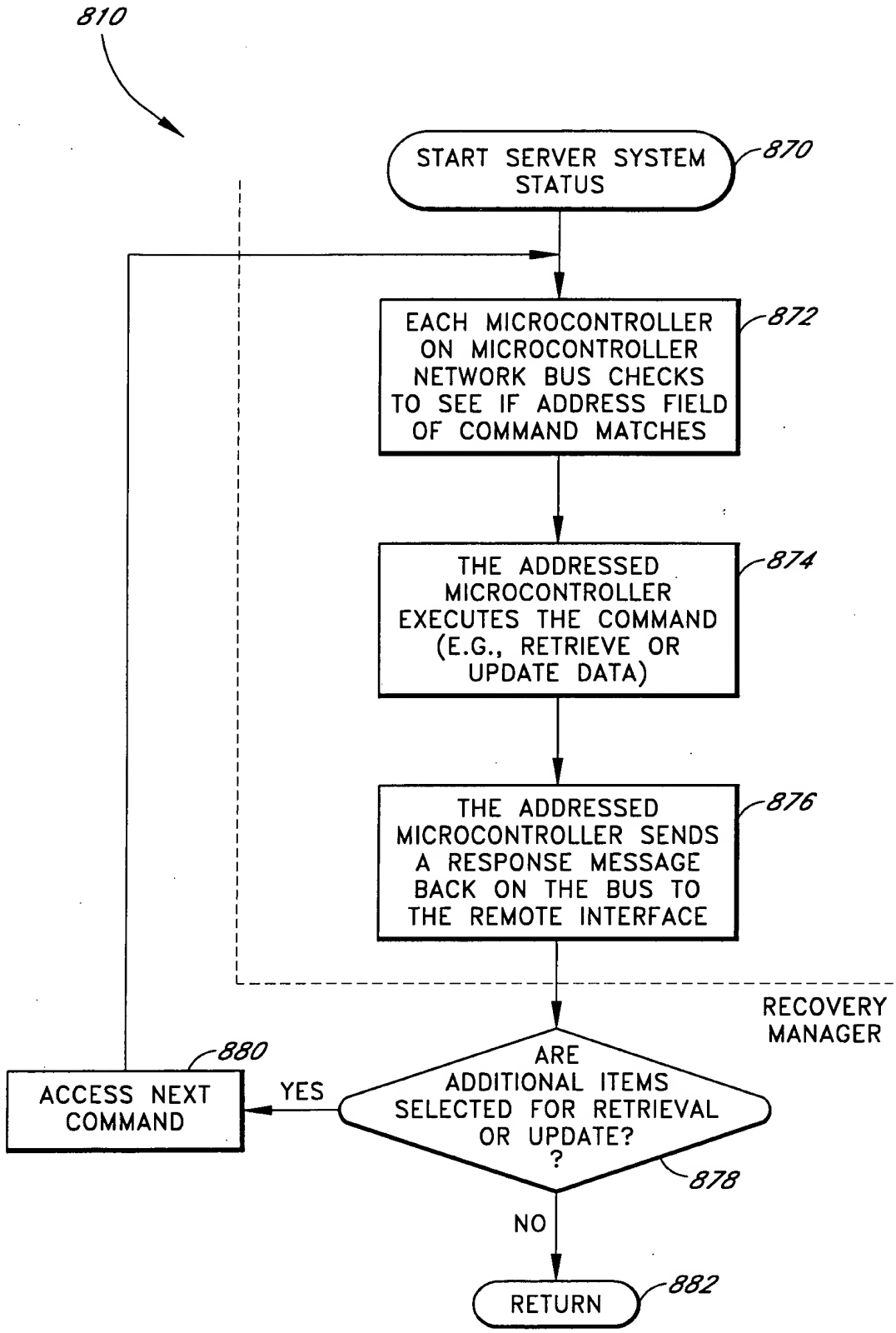

810
START SERVER SYSTEM STATUS
870
EACH MICROCONTROLLER ON MICROCONTROLLER NETWORK BUS CHECKS TO SEE IF ADDRESS FIELD OF COMMAND MATCHES
872
THE ADDRESSED MICROCONTROLLER EXECUTES THE COMMAND (E.G., RETRIEVE OR UPDATE DATA)
874
THE ADDRESSED MICROCONTROLLER SENDS A RESPONSE MESSAGE BACK ON THE BUS TO THE REMOTE INTERFACE
876
RECOVERY MANAGER
ARE ADDITIONAL ITEMS SELECTED FOR RETRIEVAL OR UPDATE?
878
YES
ACCESS NEXT COMMAND
880
NO
RETURN
882

FIG. 14

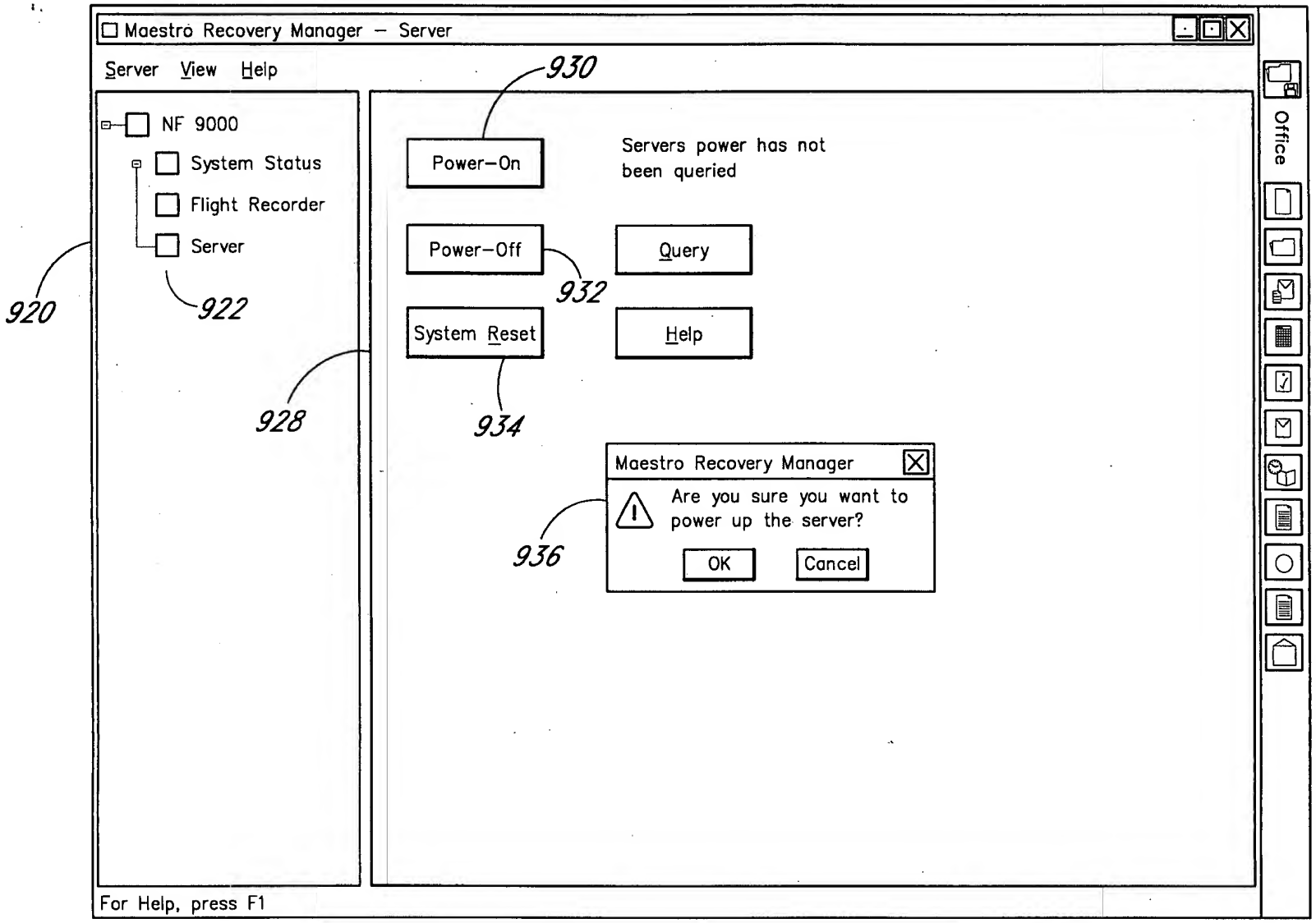

Maestro Recovery Manager – Server
Server View Help
NF 9000
System Status
Flight Recorder
Server
920
922
928
930
Power–On
Servers power has not been queried
Power–Off
932
Query
System Reset
Help
934
Maestro Recovery Manager
Are you sure you want to power up the server?
936
OK
Cancel
Office
For Help, press F1

FIG. 15

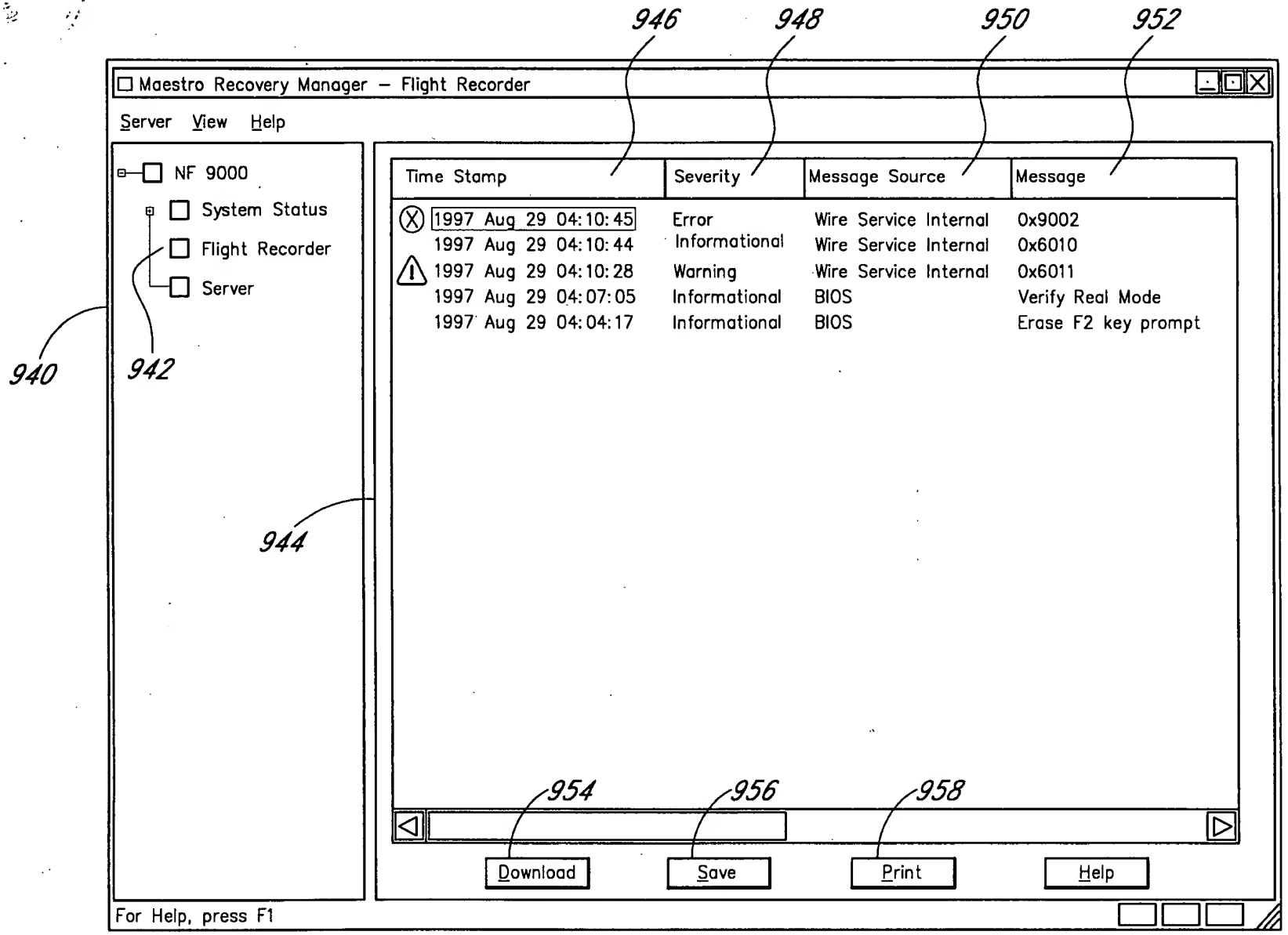

946
948
950
952
Maestro Recovery Manager – Flight Recorder
Server View Help
NF 9000
System Status
Flight Recorder
Server
940
942
944
Time Stamp
Severity
Message Source
Message
1997 Aug 29 04:10:45
Error
Wire Service Internal
0x9002
1997 Aug 29 04:10:44
Informational
Wire Service Internal
0x6010
1997 Aug 29 04:10:28
Warning
Wire Service Internal
0x6011
1997 Aug 29 04:07:05
Informational
BIOS
Verify Real Mode
1997 Aug 29 04:04:17
Informational
BIOS
Erase F2 key prompt
954
956
958
Download
Save
Print
Help
For Help, press F1

FIG. 16

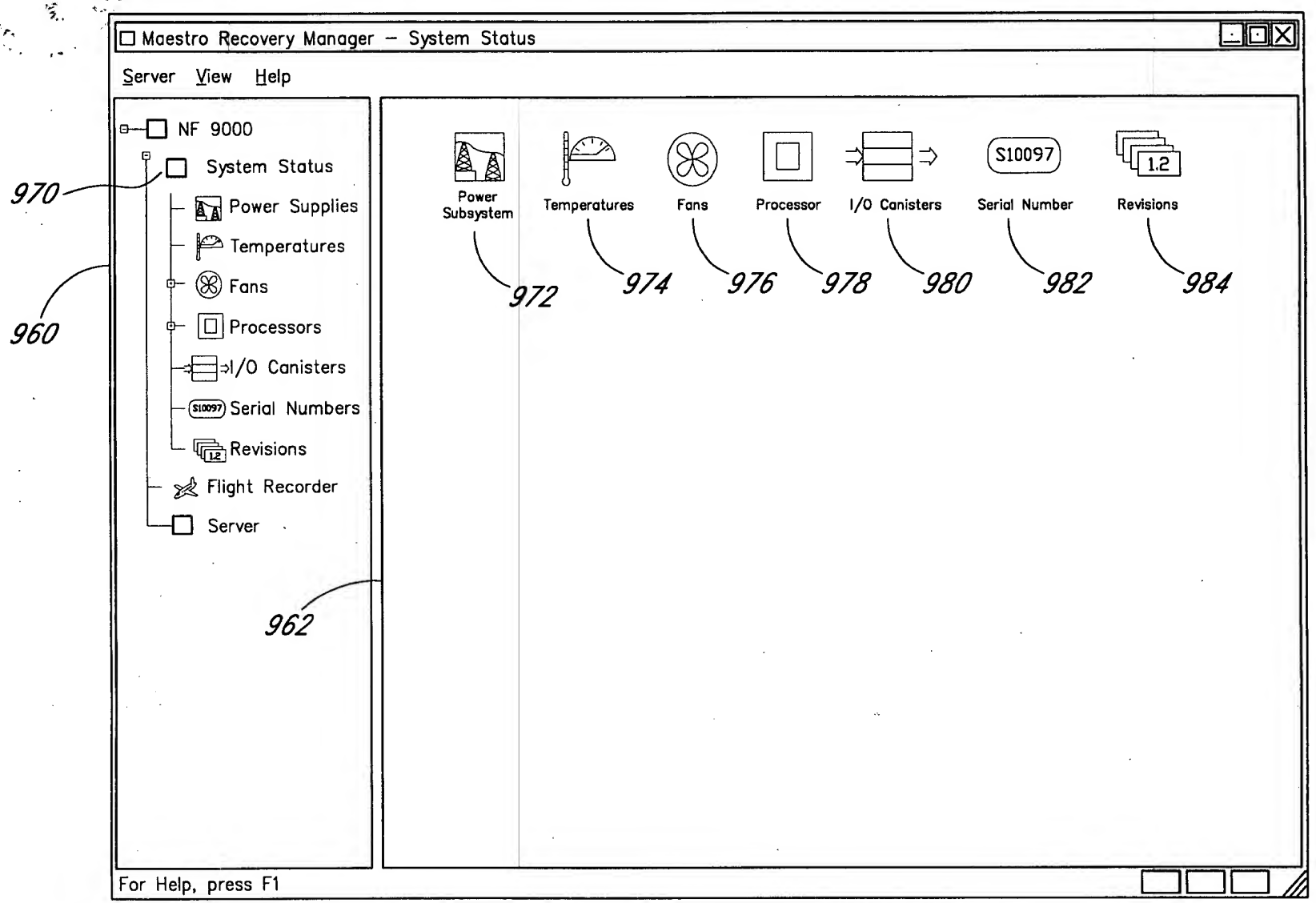

Maestro Recovery Manager – System Status
Server View Help
NF 9000
System Status
Power Supplies
Temperatures
Fans
Processors
I/O Canisters
Serial Numbers
Revisions
Flight Recorder
Server
970
960
962
Power Subsystem
Temperatures
Fans
Processor
I/O Canisters
Serial Number
Revisions
S10097
1.2
972
974
976
978
980
982
984
For Help, press F1

FIG. 17

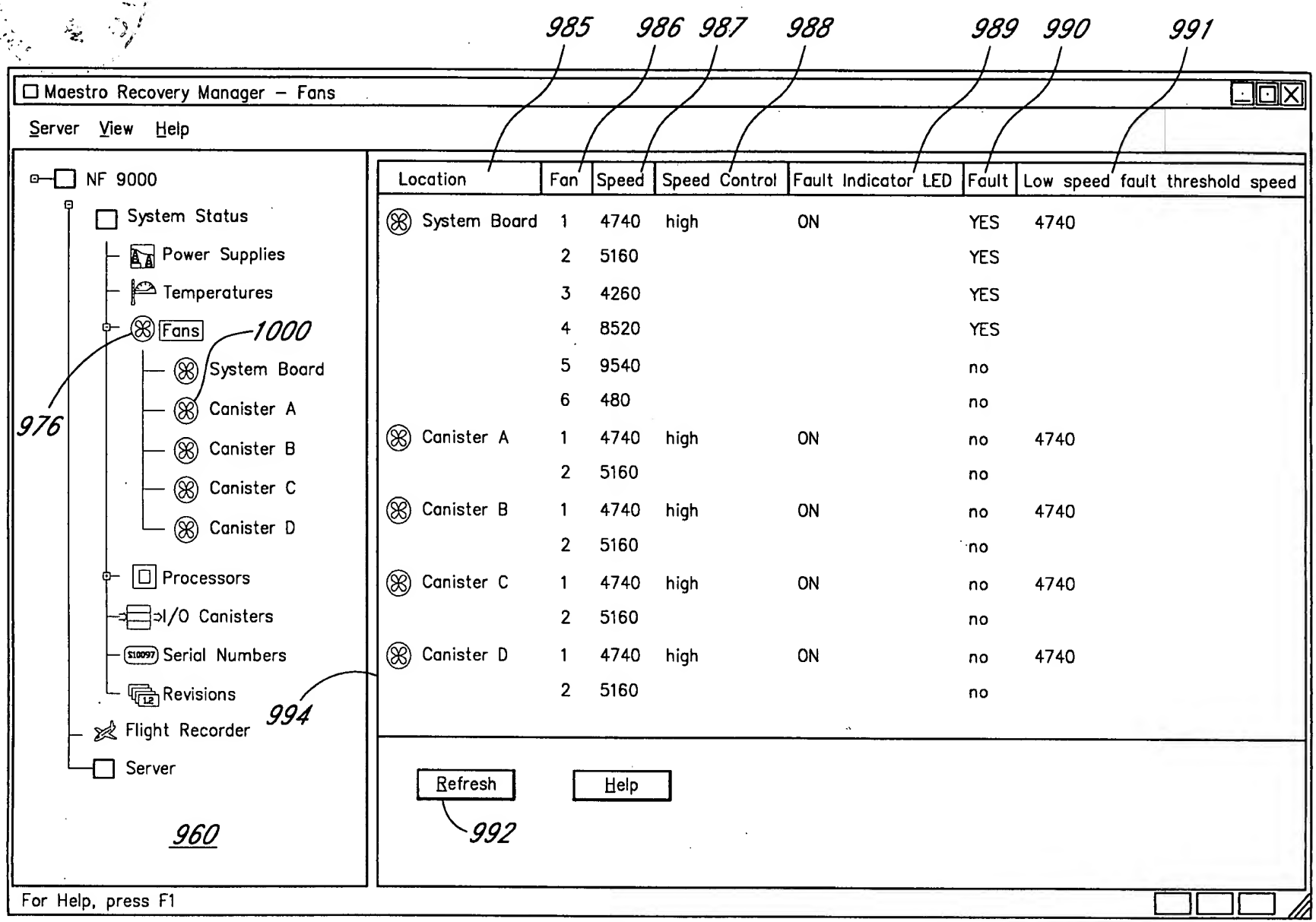

985
986
987
988
989
990
991
Maestro Recovery Manager – Fans
Server View Help
NF 9000
System Status
Power Supplies
Temperatures
Fans
System Board
Canister A
Canister B
Canister C
Canister D
Processors
I/O Canisters
Serial Numbers
Revisions
Flight Recorder
Server
976
1000
994
960
Location
Fan
Speed
Speed Control
Fault Indicator LED
Fault
Low speed fault threshold speed
System Board 1 4740 high ON YES 4740
2 5160 YES
3 4260 YES
4 8520 YES
5 9540 no
6 480 no
Canister A 1 4740 high ON no 4740
2 5160 no
Canister B 1 4740 high ON no 4740
2 5160 no
Canister C 1 4740 high ON no 4740
2 5160 no
Canister D 1 4740 high ON no 4740
2 5160 no
Refresh
Help
992
For Help, press F1

FIG. 18

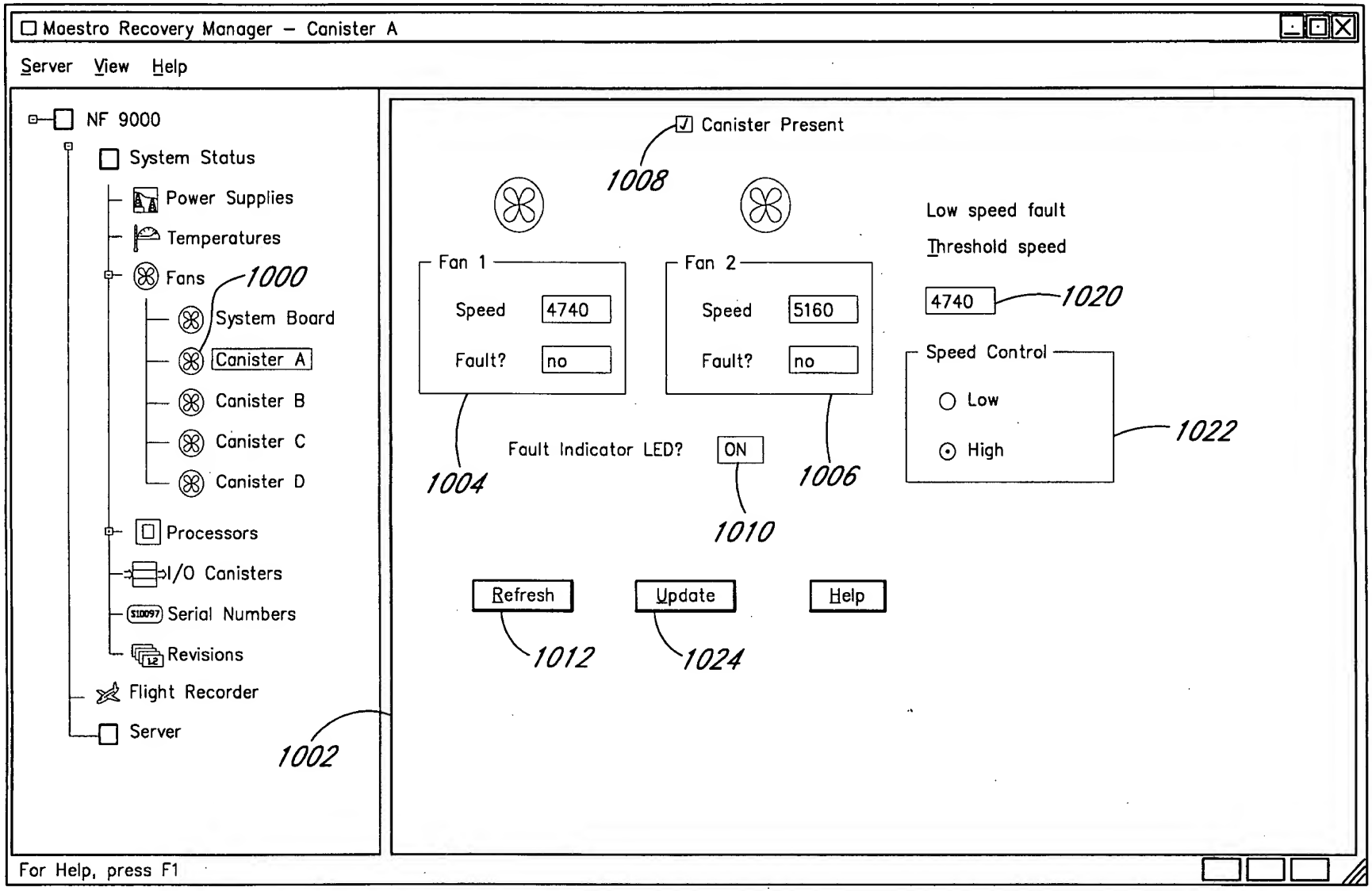

Maestro Recovery Manager – Canister A
Server View Help
NF 9000
System Status
Power Supplies
Temperatures
Fans
System Board
Canister A
Canister B
Canister C
Canister D
Processors
I/O Canisters
Serial Numbers
Revisions
Flight Recorder
Server
1000
1002
Canister Present
1008
Fan 1
Speed 4740
Fault? no
Fan 2
Speed 5160
Fault? no
1004
1006
Fault Indicator LED? ON
1010
Low speed fault
Threshold speed
4740
1020
Speed Control
Low
High
1022
Refresh
Update
Help
1012
1024
For Help, press F1

FIG. 19